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CAMP LEJEUNE: CONTAMINATION AND COMPENSATION, LOOKING BACK, MOVING FORWARD

HEARING

BEFORE THE

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT

COMMITTEE ON SCIENCE AND TECHNOLOGY

HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

SEPTEMBER 16, 2010

Serial No. 111–108

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CAMP LEJEUNE: CONTAMINATION AND COMPENSATION, LOOKING BACK, MOVING FORWARD

THURSDAY, SEPTEMBER 16, 2010

House of Representatives,
Subcommittee on Investigations and Oversight,
Committee on Science and Technology,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:07 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Brad Miller [Chairman of the Subcommittee] presiding.

Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward

Thursday, September 16, 2010, 10 a.m.

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

Witnesses:

Panel I

Dr. Richard Clapp, *Professor Emeritus, Department of Environmental Health, Boston University School of Public Health, environmental health policy consultant and member of the ATSDR Camp Lejeune Community Assistance Panel (CAP)*

Mr. Mike Partain, *Member, ATSDR Camp Lejeune Community Assistance Panel (CAP) and breast cancer survivor born on Camp Lejeune*

Mr. Peter Devereaux, *Former Marine Corps Corporal and Camp Lejeune veteran diagnosed with breast cancer*

Mr. Jim Watters, *Director, Graduate Medical Education, Texas Tech University Health Sciences Center, former Navy Lieutenant, retired Commander, Navy Reserve, Medical Service Corps and Camp Lejeune veteran diagnosed with kidney cancer*

Mr. Michael Hargett, General Director, Anchimeric Associates and former co-owner of Grainger Laboratories

Panel II

Dr. Chris Portier, *Director, Agency for Toxic Substances and Disease Registry (ATSDR)*

Mr. Thomas J. Pamperin, *Associate Deputy Under Secretary for Policy and Program Management, Veterans Benefits Administration, U.S. Department of Veterans Affairs*

Major General Eugene G. Payne, Jr., *Assistant Deputy Commandant for Installations and Logistics (Facilities), Headquarters, United States Marine Corps*

10:00a.m. – 12:00p.m.
2318 Rayburn House Office Building (WEBCAST)

HEARING CHARTER

COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
U.S. HOUSE OF REPRESENTATIVES

Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward

SEPTEMBER 16, 2010
10:00 A.M. TO 12:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

The Investigations and Oversight Subcommittee of the House Committee on Science and Technology will convene a hearing at 10:00 a.m. on Thursday, September 16, 2010, to examine the toxic legacy of drinking water contamination at Marine Corps Base Camp Lejeune in North Carolina. The hearing will examine the Department of the Navy and U.S. Marine Corps' knowledge of past contamination at Camp Lejeune, as well as prior and current analyses by the Agency for Toxic Substances and Disease Registry (ATSDR), a sister agency of the Centers for Disease Control and Prevention (CDC), regarding toxic exposures at Camp Lejeune. The hearing will also review current cooperative efforts by the U.S. Navy and ATSDR concerning the identification and access to records required to complete these studies. In addition, the hearing will examine the process by which veterans have been compensated for illnesses due to environmental exposures at Camp Lejeune and what steps the Department of Veterans Affairs (VA) and U.S. Navy are currently taking to ensure that Camp Lejeune veterans and their dependents are quickly and appropriately compensated for any illnesses or health issues related to toxic exposures while serving at the Camp Lejeune Marine Corps Base.

Key Issues.

1. **U.S. Marine Corps (USMC)**. For thirty years, Marines and their dependents serving at Camp LeJeune were exposed to toxic chemicals in their drinking water. It took the USMC more than four years to shut down drinking water wells they knew to be contaminated with toxic chemicals and another 24 years and an act of Congress to force them to inform veterans about this contamination of potential health problems. For two decades the U.S. Marine Corps prevented full disclosure regarding the true extent of contamination at Camp Lejeune. In the past, ATSDR has struggled to obtain complete cooperation and support from the Navy in providing them with records necessary to conduct accurate and comprehensive public health assessments of Camp Lejeune's toxic hazards. The U.S. Marine Corps continue to view past environmental contamination at Camp Lejeune as a public relations battle rather than a public health hazard. In July 2010, for instance, they released a glossy booklet on Camp Lejeune's Historic Drinking Water which excludes critical information and misrepresents scientific conclusions about the health impact of past toxic exposures on Camp Lejeune residents.
2. **Agency for Toxic Substances and Disease Registry (ATSDR)**. In 1997 ATSDR published a Public Health Assessment (PHA) on Camp Lejeune that concluded exposures to volatile organic compounds (VOCs) in the tap water, including trichloroethylene (TCE), tetrachloroethylene (PCE), and 1,2-dichloroethylene (DCE), were a past public health hazard. But ATSDR failed to adequately investigate exposures to another toxic contaminant found in the Camp Lejeune water supply: benzene. The final PHA included a single reference to benzene in an appendix despite the fact the agency had records indicating high levels of benzene contamination in wells on the base. Last year ATSDR withdrew that Public Health Assessment, partly because they claimed that in the intervening years since it was published in 1997 they discovered additional records about the extent of toxic contamination at Camp Lejeune. Indeed, the recent discovery of Navy records drastically alters previous conclusions about the extent of benzene contamination at Camp Lejeune. However, even the information ATSDR had in 1997 should have

sparked a much more aggressive investigation of the benzene exposures at the time.

3. **Department of Veterans Affairs (VA)**. The VA currently has 191 claims from Camp Lejeune veterans. They have reviewed 15–16 of those cases and granted claims to 5–6 veterans determining that their illnesses are 'more likely than not' tied to toxic chemical exposures from Camp Lejeune's drinking water. Two of those six veterans who received claims will be testifying at the Subcommittee's hearing. Currently the VA handles disability claims based on exposure to contaminated water at Camp Lejeune on a case-by-case basis. However, the Secretary of the VA is currently weighing a decision regarding the establishment of specific presumptive health conditions tied to environmental exposures at Camp Lejeune. Subcommittee Chairman Miller introduced a bill last year called the *Janey Ensminger Act* that would have the VA provide health care services to both veterans and their family members who have experienced adverse health effects as a result of exposures to contaminated drinking water at Camp Lejeune.

Background

Marine Corps Base (MCB) Camp Lejeune covers approximately 233 square miles in Onslow County, North Carolina. The base and surrounding area is home to an active duty, dependant, retiree and civilian population of approximately 170,000. Camp Lejeune's mission is to maintain combat ready units for expeditionary deployment. Since MCB Camp Lejeune began operations in 1941, environmental contamination has occurred in many areas due to the use, handling, and disposal of hazardous chemicals. Contaminated areas are scattered within the industrial, training and residential areas on the base. As many as one million individuals have been exposed to these contaminants.

Warnings of the base's contaminated drinking water problems first surfaced in 1980. The laboratory of the U.S. Army Environmental Hygiene Agency collected water samples at Camp Lejeune on October 21, 1980, and ran tests on those samples ten days later. A handwritten surveillance report form noted:

> WATER IS HIGHLY CONTAMINATED WITH LOW MOLECULAR WEIGHT HALO-GENERATED HYDROCARBONS.[1]

The Army ran follow-up tests in January, February and March 1981. Both the January and February 1981 surveillance report forms said:

> YOU NEED TO ANALYZE FOR CHLORINATED ORGANICS . . . .[2]

Each report carried similar warnings about contamination and showed there was strong interference in getting accurate test results due to unidentified chemicals. The Chief of Laboratory Services again offered warnings on his remarks regarding the results of the March 1981 test data:

> WATER HIGHLY CONTAMINATED WITH OTHER CHLORINATED HYDROCARBONS (SOLVENTS)![3]

On August 10, 1982, Bruce A. Babson, a chemist at Grainger Laboratories who had been contracted by the Marine Corps to conduct environmental sampling at Camp Lejeune wrote to the Commanding General of the Camp Lejeune Marine Corps Base:

> Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation (sic) of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejeune personnel.[4]

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[1] William C. Neal, Jr., Chief, Laboratory Services, TTHM (trihalomethane) Surveillance Report Form, Installation: MCB—LA JEUNE (sic)—HADNOT POINT, Date Collected: 21 Oct. 1980, Date Received: 30 Oct. 1980, Data Analyzed: 31 Oct. 1980.

[2] William C. Neal, Jr., Chief, Laboratory Services, TTHM (trihalomethane) Surveillance Report Form, Installation: CAMP LA JEUNE (sic) HADNOT POINT, Date Collected: 29 Jan., 1981, Date Received: 30 Jan., 1981, Data Analyzed: 9 Feb. 1981.

[3] William C. Neal, Jr., Chief, Laboratory Services, TTHM (trihalomethane) Surveillance Report Form, Installation: CAMP LA JEUNE (sic) HADNOT POINT, Date Collected: 26 Feb. 1981, Date Received: 9 Mar. 1981, Data Analyzed: 9 Mar. 1981.

[4] Bruce A. Babson, Chemist, Grainger Laboratories to Commanding General, Marine Corps Base, Camp Lejeune, NC, Attention: AC/S Facilities, August 10, 1982, Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Nine days later, Elizabeth A. Betz, the Supervisory Chemist in the Quality Control Lab at Camp Lejeune wrote a memorandum to one of her colleagues regarding the August 10, 1982 letter from Grainger Labs chemist Bruce Babson and previous conversations she had had with Grainger Lab co-owner Mike Hargett. The lab had identified the chemicals that had been interfering with previous test results. In the Tarawa Terrace water treatment plant and system the interfering chlorinated hydrocarbon was determined to be tetrachloroethylene, otherwise known as perchloroethylene, wrote Betz. An analysis of the Hadnot Point water treatment plant and system showed trichloroethylene and low levels of tetrachloroethylene. Betz indicated that neither of these chemicals were regulated under the Safe Drinking Water Act at the time. Nevertheless, Betz noted that they were still harmful to humans:

> Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethanes), at high levels, has been reported to produce liver and kidney damage and central nervous system disturbances in humans.[5]

Despite these warnings it took more than two more years, and the discovery of another more sinister contaminant, benzene, before Department of the Navy or the U.S. Marine Corps took steps to actually close the contaminated wells. In July 1984 test data from another contractor indicated that well #602 in the Hadnot Point Industrial Area had a benzene level of 380-parts per billion (ppb). The current maximum contaminant limit for benzene exposure set by the Environmental Protection Agency (EPA) is 5-ppb.

The Marine Corps claim they did not receive this disturbing test data until November 1984 and took immediate actions to shut down the well. One record from Camp Lejeune's supervisory chemist, Elizabeth Betz, in April 1989 suggests that base officials were not informed of the benzene contamination in Well #602 at the Hadnot Point Fuel Farm until November 30, 1984, when they received a call about the test results from the Naval Facilities Engineering Command, Atlantic Division (LANTDIV) based in Norfolk, Virginia. It has remained unclear, however, when Navy officials at LANTDIV were made aware of the July 1984 benzene test results. Finally, however, after more than four years after Camp Lejeune officials first learned of toxic contamination in some of the base's drinking water wells they took action to shut these wells down. Between November 1984 and February 1985, ten potable water wells at Camp Lejeune, including Hadnot Point's well #602 were finally shut down and taken out of service due to contamination with volatile organic chemicals (VOCs).

ATSDR Steps In.

In December 1988, the Department of the Navy issued a letter to ATSDR requesting that the agency perform a health assessment at Camp Lejeune. In October 1989, Camp Lejeune was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL). In 1991 ATSDR began a Public Health Assessment (PHA) of toxic contamination at Camp Lejeune. In October 1994 ATSDR published an "Initial Release" version of its assessment and in 1997 it released the final version of the report.

The ATSDR assessment found three past public health hazards: 1) exposure to lead in the tap water in on-base buildings containing lead plumbing; 2) past exposure to VOCs in three drinking water systems on base (Tarawa Terrace, Hadnot Point, and Holcombe Boulevard); and 3) past exposure to pesticides in the soil at a former day-care center. It also considered three issues to be of no apparent hazard: 1) groundwater contamination on base; 2) exposure from eating fish from Wallace Creek, Bear Head Creek, Cogdels Creek, Orde Pond, Everett Creek, and the New River near Sites 28, 69, and 48 and; 3) Soil Contamination at Site 69.

The 1997 Public Health Assessment stated:

> "Volatile organic compound (VOC) levels in three base drinking water systems (Tarawa Terrace, Hadnot Point, and Holcombe Boulevard) were a health concern until 1985 when use of contaminated wells stopped. Well contamination was caused from leaks in off-base and on-base underground tanks that were installed in the 1940s and 1950s. Human exposure to trichloroethylene (TCE), tetrachloroethylene (PCE), and 1,2-dichloroethylene (DCE) in drinking water systems at MCB Camp Lejeune have been documented over a period of 34

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[5] Memorandum, Subj: Grainger Laboratories Letter of 10 August 1982, From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv; To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv, Date: 19 August 1982.

> months, but likely occurred for a longer period of time, perhaps as long as 30 years."[6]

But the ATSDR Public Health Assessment (PHA) had a critical omission. It failed to address the issue of known benzene contamination in Camp Lejeune's drinking water supply. The report contained a single reference to benzene in a chart in the appendix of the publication regarding well 602 at the Hadnot Point Industrial Area Tank Farm. "Groundwater contamination (benzene, etc.) was detected in base drinking water supply well 602," said the assessment. "That well has not been used since 1984." Yet, references in the final 1997 and the previous two drafts of the document released by ATSDR in 1994 and 1995 all contained references to a May 1988 "confirmation study" by Environmental Science and Engineering, Inc. that highlighted extremely elevated levels of benzene in the water supply wells at Camp Lejeune.

ATSDR scientists involved in the PHA say they did not pursue the benzene issue further at the time because there was no evidence benzene was detected "at the tap." This justification for not evaluating the likelihood of benzene exposure at the base was cited in a 1994 draft of ATSDR's Public Health Assessment, but was removed from the final version. However, an August 1998 publication by ATSDR on "Adverse Pregnancy Outcomes" at Camp Lejeune says that while benzene was not detected in the "Hadnot Point tap water," "Nonetheless, low level exposure (an estimated 35 ppb) would have been expected among women receiving Hadnot Point water before December 1984." The contaminated well was shut down in November 1984, four months after the benzene was first discovered in well #602 in July 1984.

In addition, at some point between 1995 and the publication of the final ATSDR Public Health Assessment on Camp Lejeune in 1997, the agency's *entire* file on Camp Lejeune was mistakenly thrown out—tossed in the trash—by a contractor. It is still unclear how ATSDR published a final version of the Public Health Assessment without the supporting documents, but ATSDR says they knew where to go to retrieve the scientific references in the 1997 Public Health Assessment even if they did not actually have the data on hand.

Last year ATSDR withdrew its 1997 PHA, partly because they claimed that in the intervening years since its publication new material was discovered about the extent of toxic benzene contamination at Camp Lejeune. It is true that new data ATSDR has obtained from a Department of Navy database in the past year regarding the degree of benzene contamination at Camp Lejeune significantly alters the evaluation of the public health impact of exposures to this toxic chemical at Camp Lejeune. ATSDR did, however, acknowledge the flaws in the 1997 assessment when they publicly removed it from their web-site. "Also, at the Camp Lejeune site, benzene was present in one drinking-water supply well in the Hadnot Point drinking water system," ATSDR said. "That well was shut down sometime prior to 1985. This information should have been included in the PHA but was not. The PHA should have mentioned the contamination and stated that the extent of exposure to benzene from that well was unknown."

ATSDR has struggled to obtain full access to U.S. Marine Corps and Department of Navy records regarding Camp Lejeune's environmental contamination for years. As early as 1994 ATSDR began writing letters to the U.S. Marine Corps complaining that they were not receiving the cooperation or access to vital records regarding the full extent of toxic contamination on Camp Lejeune or the potential health impact. These issues have flared up sporadically ever since. In 2005 ATSDR informed investigators at the Government Accountability Office (GAO) that it had learned there were a "substantial number of additional documents that had not been previously provided to them by Camp Lejeune officials."

It is difficult to provide clear scientific analyses when you cannot be certain that the records you are relying on for that analysis are complete. In the past most estimates assumed between 20,000 to 30,000 gallons of fuel had leaked from the underground storage tanks at Camp Lejeune, for instance. The newly discovered Navy documents, however, estimate that between 1988 and 1991 there was as much as 1.1 million gallons of gasoline floating on top of the groundwater table at Camp Lejeune. The report noted: "While this estimated volume seems incredibly large, it must be remembered that this took place over 50 years, yielding an average loss of over 21,200 gallons/year (or 58 gallons/day.)" Benzene is a key component of gasoline. ATSDR officials say they had never been informed of these records previously and stumbled upon them without any direction from the U.S. Marine Corps or Department of the Navy.

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[6] "Public Health Assessment for U.S. Marine Corps Camp LeJeune Military Reservation Camp LeJeune, Onslow County, North Carolina, August 4, 1997, Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services, p.2.

Despite this, it is also clear from the Subcommittee's review of records that ATSDR had significant information about benzene contamination at Camp Lejeune when they conducted their health assessment in 1997 and should have been more diligent in investigating the public health implications of the benzene contamination at the time. To help resolve issues regarding identification and access to Camp Lejeune environmental documents necessary for ATSDR to complete its ongoing health studies and analyses regarding toxic exposures at the base ATSDR and the Department of the Navy have formed a datamining work group that is attempting to resolve these access issues quickly.

ATSDR currently has five separate health investigations regarding Camp Lejeune in the works. Some of these projects have been ongoing for years and four of the five studies will not be completed until at least spring 2012. The last one is expected in 2013. Considering these studies have taken years already to complete ATSDR should make every effort to finalize them as soon as possible without jeopardizing the scientific integrity of the products they deliver.

National Research Council (NRC) report.

In 2009 the National Research Council (NRC) of the National Academies published *Contaminated Water Supplies at Camp Lejeune—Assessing the Potential Health Effects*. The NRC study was mandated at the direction of Congress in the National Defense Authorization Act for Fiscal Year 2007 (Public Law 109–364, 109th Congress). The legislation specifically called for the Secretary of the Navy to enter into an agreement with the National Academy of Sciences to conduct a comprehensive review and evaluation of the available scientific and medical evidence regarding associations of human exposure to drinking water contaminated with trichloroethylene (TCE) and tetrachloroethylene (PCE) at Camp Lejeune, North Carolina. The legislation never directed the NRC to evaluate exposures to benzene and they did not do so.

The committee divided its review into two major categories: (1) evaluating the exposures of former residents and workers to the contamination of the Tarawa Terrace and Hadnot Point water-supply systems, and (2) evaluating the potential health effects associated with the water contaminants TCE and PCE. The assessments were then considered together to ascertain whether conclusions could be drawn about whether any adverse health outcomes could be attributed to the water contaminants. The report's main conclusion:

> It cannot be determined reliably whether diseases and disorders experienced by former residents and workers at Camp Lejeune are associated with their exposure to contaminants in the water supply because of data shortcomings and methodological limitations, and these limitations cannot be overcome with additional study. Thus, the committee concludes that there is no scientific justification for the Navy and Marine Corps to wait for the results of additional health studies before making decisions about how to follow up on the evident solvent exposures on the base and their possible health consequences. The services should undertake the assessments they deem appropriate to determine how to respond in light of the available information.[1]

"Camp Lejeune: Historic Drinking Water, Questions and Answers," U.S. Marine Corps, July 2010

The U.S. Marine Corps has attempted to mischaracterize the National Research Council (NRC) report as well as ATSDR's past health studies in their most recent public relations document regarding contaminated drinking water at Camp Lejeune. In July, the U.S. Marine Corps published a glossy booklet that sought to provide "questions and answers" regarding Camp Lejeune's drinking water history. But the booklet is misleading in several regards.

The Marine Corps booklet asserts:

> Since 1991, several health initiatives have been conducted to identify the possible effects of exposure to contaminated water at Camp Lejeune. The studies conducted to date have not shown any causal link between exposure to contaminated water at Camp Lejeune and illnesses.[7]

In fact, in at least three separate places in the short Marine Corps booklet they claim that no studies have shown an "association between exposure to the contaminated water and health conditions reported by former residents of Camp Lejeune."

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[1] NRC report, page 13

[7] "Camp Lejeune: Historic Drinking Water, Questions and Answers," U.S. Marine Corps, July 2010, p. 10.

However, ATSDR informed the Marine Corps on September 10, 2010, that these statements are incorrect and said the only completed health study at Camp Lejeune which was conducted by ATSDR did, in fact, find an association between adverse health effects and exposures to PCE on the base.

ATSDR reminded the Marine Corps that in their report "associations were found with Small for Gestational Age (SGA) and specific sub-groupings of PCE-exposed mothers. SGA was not a health condition "reported by former residents" but instead was an adverse outcome that has been found in other studies at other sites to be associated with environmental exposures including exposures to chemical drinking water contaminants," wrote ATSDR. "Evidence exists, based mostly on occupational studies, of associations between these chemical contaminants and cancers and other adverse health outcomes." ATSDR recommended that the Marine Corps "booklet should report these findings and state that research on other illnesses is still underway."

In addition, the Marine Corps booklet uses several arguments to explain why they did not immediately shut down water wells they knew were contaminated with toxic chemicals. They have argued that they immediately shut down the wells once they identified the "source" of the contamination. But this response fails to answer the question why they did not shut the wells down once they first learned that they were contaminated with hazardous chemicals.

The Marine pamphlet suggests that the chemicals in the drinking water, at the time, were not regulated by the Safe Drinking Water Act so they had no obligation or legal responsibility to close them. "In 1982, the interfering chemicals in the base water system were identified as trichloroethylene (TCE) and perchloroethylene (PCE), which were not regulated by the Safe Drinking Water Act at the time," the Marine Corps booklet states. "When contaminants were subsequently discovered in certain wells, these wells were promptly removed from service."

But back in 1982 when Navy chemist Elizabeth Betz wrote her memorandum on Grainger Laboratories' discovery of high levels of trichloroethylene (TCE) in the Camp Lejeune water supply she also noted that it was not regulated by the Safe Drinking Water Act at the time. Still, this did not obscure her knowledge that it was still hazardous to human health in spite of the lack of regulations governing human exposures to it. Even before TCE, PCE and benzene were added to the list of chemicals that were regulated by the Safe Drinking Water Act between 1989 and 1992, it was well established these chemicals were hazardous. It is important to remember that in 1982 when Betz wrote that memo warning of the health implications of exposures to these chemicals they were not regulated by the Safe Drinking Water Act, but were clearly dangerous to human health nonetheless. Betz warned:

> Trichloroethylene, like tetrachloroethylene and other halogenated hyudrocarbons (ie Trihalomethands), at high levels, has been reported to produce liver and kidney damage and central nervous system disturbances in humans.[8]

Today, the Department of Veterans Affairs is beginning to provide benefits to Camp Lejeune veterans who were exposed to TCE, for instance, and developed kidney cancer as a result. One of the witnesses at the Subcommittee hearing, Jim Watters, is a Camp Lejeune vet who developed kidney cancer from his exposures to these chemicals at Camp Lejeune and received a 100-percent disability award from the VA last year.

The unofficial motto of the U.S. Marine Corps is to "never leave a Marine behind." This should be applied not just to the brave Marines that have fought for our nation around the world but for those at home as well. And Camp Lejeune veterans should be no exception.

Witnesses:

Panel I

Dr. Richard Clapp, *Professor Emeritus, Department of Environmental Health, Boston University School of Public Health, environmental health policy consultant and member of the ATSDR Camp Lejeune Community Assistance Panel (CAP)*

Mr. Mike Partain, *Member, ATSDR Camp Lejeune Community Assistance Panel (CAP) and breast cancer survivor born on Camp Lejeune*

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[8] Memorandum, Subj: Grainger Laboratories Letter of 10 August 1982, From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv; To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv, Date: 19 August 1982.

Mr. Peter Devereaux, *Former Marine Corps Corporal and Camp Lejeune veteran diagnosed with breast cancer*

Mr. Jim Watters, *Director, Graduate Medical Education, Texas Tech University Health Sciences Center, former Navy Lieutenant, retired Commander, Navy Reserve, Medical Service Corps and Camp Lejeune veteran diagnosed with kidney cancer*

Mr. Michael Hargett, General Director, Anchimeric Associates and former co-owner of Grainger Laboratories

Panel II

Dr. Chris Portier, *Director, Agency for Toxic Substances and Disease Registry (ATSDR)*

Mr. Thomas J. Pamperin, *Associate Deputy Under Secretary for Policy and Program Management, Veterans Benefits Administration, U.S. Department of Veterans Affairs*

Major General Eugene G. Payne, Jr., *Assistant Deputy Commandant for Installations and Logistics (Facilities), Headquarters, United States Marine Corps*

10:00a.m. – 12:00p.m.
2318 Rayburn House Office Building (WEBCAST)

Chairman MILLER. This hearing will now come to order.

Just a quick word on pronunciation. The Marines properly honored General Lejeune by naming an installation after him but they placed the installation in eastern North Carolina, where North Carolinians immediately called it Camp Lejeune. I suspect if they had located it in rural Georgia, Georgians would have said Camp Lejeune as well, and all of my life I have heard it called Camp Lejeune by North Carolinians and by Marines alike. I understand recently the Marines have decided that it would more appropriately honor General Lejeune if they called the base named after him Camp Lejeune. That is the way he pronounced his own name. He was from Louisiana. That is the proper French Creole pronunciation. That is the way his family pronounces his name. But I think the view of most North Carolinians is that if the Navy wanted to name a base Camp Lejeune, they should have put it in Louisiana. And just as soon as South Dakotans start calling their state capital Pierre instead of Pierre we would start saying Camp Lejeune. So it is with no disrespect to General Lejeune that I will say Camp Lejeune today because it would be changing the habits of a lifetime which would be difficult to do for today's hearing.

Good morning, and welcome to today's hearing entitled "Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward."

For 30 years, as many as one million Marines and their families training and living on the base at Camp Lejeune were exposed to toxic chemicals in their drinking water. Solvents such as trichloroethylene (TCE) and perchloroethylene (PCE) and byproducts of fuel such as benzene leeched into the base water supply and were consumed by Marines, their wives, their children and by members of the community who worked on the base.

We will never be certain about all the adverse health consequences that come from consuming that toxic cocktail, but we can be certain that some Marines and their dependants will develop cancers that will shorten their lives. In fact, that has already happened. We are certain that the Marine Corps failed to close the wells promptly when they were informed of the presence of TCE and PCE in their water. Instead, they provided that water to their people for two more years.

The wells were shut down in the mid-1980s. For the two decades, the Marine Corps leadership and the Department of the Navy have denied that they had a water problem at Camp Lejeune. Because no law was broken and the contaminated wells were eventually shut down, the Navy continues to deny that they bear responsibility for taking care of those veterans, for those Marines and their families. Children have died from rare forms of leukemia, but the Navy says they are not responsible for that. Marines and their dependants have developed male breast cancer, but the Navy says it is not their problem. While the Department of Veterans Affairs has begun to extend benefits for cancers that they view as more likely than not caused by exposure to the toxic water, to drinking the toxic water, the Navy continues to wait for scientific certainty of causation. The Navy expresses deep concern, and waits on science to answer with certainty the question of whether the toxic chemicals they admit contaminated the water at Camp Lejeune are responsible for any adverse health conditions.

As anyone who has followed science in public health should know, there will never be scientific certainty that any particular disease in any particular person is tied to any particular exposure. Toxic chemicals and human health tends to be about probabilities, not certainties. Science will never give the Navy certainty and so long as they wait, no veteran and no family member will ever receive their due from the Navy.

The Marine Corps has recently put out a glossy booklet regarding the history of Camp Lejeune's drinking water and their response to the toxic contamination at the base. It is their side of the story, but it is not a complete factual history of what happened at Camp Lejeune, what happened to Camp Lejeune's drinking water supply, nor does it accurately portray when the Marines became aware of those hazards, those known hazards, how they responded to that information or the actual public health implications of those toxic chemicals on those exposed to them.

Relying on the advice of lawyers, hiding behind science that is slow and uncertain, and spending more energy on public relations than on helping Marines and their families, the leadership of the Marine Corps and Navy appears to have qualified their sense of service and obligation by concerns about possible legal liability. They are faithful only to the point that their attorneys tell them not to admit responsibility or accept liability.

The facts are these: The U.S. Marine Corps failed to act quickly or forcefully enough in the 1980s to close down water supply wells it knew were contaminated with toxic chemicals that were endangering the health and safety of its Marines and their families at Camp Lejeune.

I would like to understand why it took so long for the Marine Corps to respond because they have so far failed to provide any adequate explanation to the public, Congress or the Marines who served at Camp Lejeune and their families. I hope that U.S. Marine Corps Major General Payne can address those issues today. He will be on the second panel.

For its part, the Agency for Toxic Substances and Disease Registry (ATSDR), a sister agency of the Centers for Disease Control and Prevention (CDC), produced a public health assessment of human health hazards posed by Camp Lejeune's drinking water supply in 1997 that was inadequate. I am glad to see that the agency has acknowledged that inadequacy and had withdrawn this publication last year. The 1997 health assessment evaluated the public health impact from exposures to TCE and PCE that infiltrated the drinking water supply at Camp Lejeune up through the 1980s, but it failed to investigate and evaluate the effect of benzene contamination at the base at that time. It is critically important that ATSDR carry out its slate of proposed studies as quickly as possible. These studies will not provide the certainty regarding exposure and disease that some expect, but they should help identify the range of possible cancers and other conditions that could be produced from exposure to the polluted drinking water at Camp Lejeune.

We will hear today from the Department of Veterans Affairs. I am pleased that the VA has begun to award some Camp Lejeune veterans for illnesses they developed that the VA has found were more likely than not caused by exposures to toxic chemicals in the drinking water at Camp Lejeune. Two of our witnesses are among the half dozen awards the VA has already granted. But that leaves dependants of Marine veterans who have been harmed by these exposures, like Mike Partain, to fall through the cracks.

I introduced a bill last year called the Janey Ensminger Act that would have the VA provide health care services to both veterans and their family members who have experienced adverse health effects as a result of exposure to contaminated drinking water at Camp Lejeune. The bill is named for Janey Ensminger, a nine-year-old girl who died from childhood Leukemia in 1985 after being exposed to the drinking water while her mother was pregnant with her. Her father is 24-year Marine veteran, Jerry Ensminger, who is here today, who has testified powerfully before this Committee in the past, and Jerry has been a tireless advocate for military families exposed to the contamination at Camp Lejeune.

I believe the VA has begun to move in the right direction by awarding this small pool of veterans the compensation they need and deserve. I believe it is time that the Department of the Navy and U.S. Marine Corps stop fighting those efforts and focus their energies on taking care of their own now and in the future. It is time that the leadership of the Navy and Marine Corp lived up to the motto of the Corps. They could learn from the example of Jerry Ensminger, who has been faithful always to the memory of his daughter and to all the victims of the toxic drinking water at Camp Lejeune.

[The prepared statement of Chairman Miller follows:]

PREPARED STATEMENT OF CHAIRMAN BRAD MILLER

The title of today's hearing is: "Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward."

For thirty years, as many as one million Marines and their families training and living on the base at Camp LeJeune were exposed to toxic chemicals in their drinking water. Solvents such as trichloroethylene (TCE) and perchloroethylene (PCE) and by-products of fuel such as benzene leeched into the base water supply and were consumed by Marines, their wives, their children and by members of the community who worked on the base.

We will never be certain about all the adverse health consequences that come from consuming that toxic cocktail, but we can be certain that some Marines and some dependents will develop cancers that will shorten their lives. We are certain that the Marine Corp failed to close the wells promptly when they were informed of the presence of TCE and PCE in their water. Instead, they provided that water to their people for two more years.

The wells were shut down in the mid-1980s. For the two decades since, the Marine Corp leadership and the Department of the Navy have denied that they have a water problem. Because "no law was broken" and the contaminated wells were, eventually, shut down, the Navy continues to deny that they bear responsibility for taking care of these veterans and their families. Children have died from rare forms of leukemia, but the Navy says they are not responsible. Marines and dependents have developed male breast cancer, but the Navy says, "not our problem". While the Department of Veterans Affairs has begun to extend benefits for cancers that they view as "more likely than not" caused by drinking the toxic water, the Navy continues to wait for scientific certainty of causation.

The Navy expresses deep concern, and waits on science to answer with certainty the question of whether the toxic chemicals they admit contaminated the water at LeJeune are responsible for any adverse health conditions. As anyone who has followed science in public health should know, there will never be scientific certainty that any particular disease in any particular person is tied to any particular exposure. Toxic chemicals and human health tends to be about probabilities, not certainties. Science will never give the Navy certainty and so long as they wait, no veteran and no family members will ever receive their due from the Navy.

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Relying on the advice of lawyers, hiding behind science that is slow and uncertain, and spending more energy on public relations than on helping Marines and their families, the leadership of the Marine Corps and Navy appears to have qualified their sense of service and obligation by concerns about possible legal liability. They are faithful only to the point where their attorneys tell them not to admit responsibility or accept liability.

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I would like to understand why it took so long for the Marine Corps to respond because they have so far failed to provide an adequate explanation to the public, Congress or the Marines who served at Camp Lejeune and their families. I hope that U.S. Marine Corps Major General Payne can help address those issues today.

For its part, the Agency for Toxic Substances and Disease Registry (ATSDR), a sister agency of the Centers for Disease Control and Prevention (CDC), produced a Public Health Assessment of human health hazards posed by Camp Lejeune's drinking water supply in 1997 that was inadequate. I am glad to see that the agency has acknowledged that inadequacy and withdrew this publication last year. The 1997 health assessment evaluated the public health impact from exposures to TCE and PCE that infiltrated the drinking water supply at Camp Lejeune up through the 1980s, but it failed to investigate and evaluate the effect of benzene contamination at the base at that time. It is critically important that ATSDR carry out its slate of promised studies as quickly as possible. These studies will not provide the certainty regarding exposure and disease that some expect, but they should help identify the range of possible cancers and other conditions that could be produced from exposure to the polluted drinking water at Camp LeJeune.

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I believe the VA has begun to move in the right direction by awarding this small pool of veterans the compensation they need and deserve. I believe it is time that the Department of the Navy and U.S. Marine Corps stop fighting these efforts, and focus their energies on taking care of their own now and in the future. It is time that the leadership of the Navy and Marine Corp lived up to the motto of the Corps.

They could learn from the example of Jerry Ensminger, who has been faithful always to the memory of his daughter and to all the victims of the toxic drinking water at Camp Lejeune.

Chairman MILLER. The Chair now recognizes our ranking member from Georgia, Dr. Broun, for an opening statement.

Mr. BROUN. Thank you, Mr. Chairman. Speculating how people in Georgia would pronounce General Lejeune's name is just speculation. We have a city called Cairo, Georgia. Most people would pronounce that Cairo. We have the University of Georgia in Albany, Georgia, where General Payne admirably served down there. But as a Marine, I know it as Camp Lejeune.

Good morning. I want to thank our witnesses for appearing today and also want to thank the chairman for holding this hearing. As a Marine, a family doctor and a legislator, I am very sensitive to the health of our service members and our veterans and to their families. We owe them a debt of gratitude for their service, a debt that must include vigilance in caring for them after leaving the military. It's a sacred obligation of this government to take care of our troops not only while they are on active duty but as well after they leave active duty.

Camp Lejeune has a proud history of training Marines to defend our Nation. Unfortunately, throughout that history the drinking water consumed on Camp Lejeune was contaminated by numerous chemicals such as TCE, DCE, PCE and benzene. Since the early 1990s, there have been multiple agencies that have looked into this issue including ATSDR, EPA, GAO and the National Academies, just to name a few. In 1997, ATSDR issued a public health assessment required under the Superfund statute. This assessment was eventually retracted in 2009 because of new information on the amount of benzene contamination that may challenge the results of that study. However, since that initial report was issued, ATSDR has initiated several other studies related to the effect of these chemicals on fetuses and the subsequent health problems of children born to mothers living and working on the base.

ATSDR is the principal investigator of the health effects related to the contamination at Camp Lejeune and there are positive steps being taken to ensure that the agency has all the information it needs to evaluate the exposures and potential health impacts but all parties must continue to cooperate. The Navy and Marine Corps have become more forthcoming with documents and data, and I applaud that. ATSDR is working to improve their processes and I hope their document retention protocols.

While I am pleased that ATSDR is continuing to look into this issue and that the VA seems to be moving in a proactive manner to ensure that veterans and their families are taken care of, this issue simply will not go away. Progress needs to continue to a successful conclusion.

When the chemicals were discovered in the water supply, the Navy and the Marine Corps shut down the contaminated wells. Whether or not this reaction was immediate or permanent is not as important as the fact that we now know that possibly hundreds of thousands may have been exposed to harmful chemicals that could have lasting impacts upon their health and their lives.

When our service members provide a blanket of security for us abroad, they reasonably expect us to ensure their safety as well as the safety of their families here at home even if the threat is from environmental hazards. Fulfilling that expectation is the least we can do.

I look forward to hearing from our witnesses.

Mr. Chairman, I yield back the balance of my time. Thank you, sir.

[The prepared statement of Mr. Broun follows:]

PREPARED STATEMENT OF REPRESENTATIVE PAUL C. BROUN

Good morning. I want to thank our witnesses for appearing today. I also want to thank the Chairman for holding this hearing. As a Marine, family doctor, and a legislator, I am very sensitive to the health of our service members, our veterans, and their families. We owe them a debt of gratitude for their service, a debt that must include vigilance in caring for them after leaving the military.

Camp Lejeune has a proud history of training Marines to defend our nation. Unfortunately, throughout that history, the drinking water consumed on Camp Lejeune was contaminated with numerous chemicals such as TCE, DCE, PCE, and benzene. Since the early 1990s, there have been multiple agencies that have looked into this issue, including ATSDR, EPA, GAO, and the National Academies—to name just a few.

In 1997, ATSDR issued a Public Health Assessment required under the Superfund statute. This Assessment was eventually retracted in 2009 because of new information on the amount of benzene contamination that may challenge the results of the 1997 study. However, since that initial report was issued, ATSDR has initiated several other studies related to the effects of these chemicals on fetuses and the subsequent health problems of children born to mothers living and working on the base.

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I look forward to hearing from our witnesses and yield back the balance of my time.

Thank you.

Chairman MILLER. Thank you, Dr. Broun.

There is one inexcusable error in my printed statement that I did correct orally but I cannot believe I let go through in editing the statement. There is a reference to soldiers. Please strike that word and insert instead the word "Marines."

Thank you, sir.

Any additional opening statements submitted by members will be included in the record.

We do have a set of documents to be included in the record. Without objection, they will be ordered included.[1]

Panel I

Chairman MILLER. It is now my pleasure to introduce our first panel of witnesses. Mr. Mike Partain was diagnosed with male breast cancer in 2007 and he has since become a community advocate and representative of the ATSDR Camp Lejeune Community Assistance Panel. Mr. Jim Watters is the Assistant Dean for Graduate Medical Education at Texas Tech University Health Sciences Center School of Medicine. As a former Navy lieutenant and retired commander, Mr. Watters also served in the U.S. Army, U.S. Navy and the U.S. Naval Reserve and is a Camp Lejeune veteran diagnosed with kidney cancer. Mr. Peter Devereux is a former Marine Corps corporal who was diagnosed with male breast cancer in 2008. In August of this year, the Department of Veterans Affairs granted him 100 percent disability linking Mr. Devereux's breast cancer to his exposure to toxic chemicals in Camp Lejeune's drinking water during his military service. Dr. Richard Clapp is Professor Emeritus of the Department of Environmental Health at Boston University's School of Public Health. He is an environmental health policy consultant and a member of the ATSDR Camp Lejeune Community Advisory Panel. And Mr. Michael Hargett, who I have not had a chance to greet, is the General Director of Anchimeric Associates and former co-owner of Grainger Laboratories, which performed tests for Lejeune drinking water in the 1980s.

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[1] Please see Appendix 2: Additional Material for the Record.

As our witnesses should know, you have five minutes for your spoken testimony. Your written testimony will be included in its entirety in the record for the hearing. When you all have completed your spoken testimony, we will begin with questions. Each member will have five minutes to question the panel. It is the practice of the Subcommittee on Investigations and Oversight to receive testimony under oath. Do any of you have any objection to taking an oath? Okay. The record should show, should reflect that all the witnesses were willing to take an oath. You may also be represented by counsel. Do any of you have counsel here? The record should reflect that none of the witnesses have counsel.

If would now please stand and raise your right hand. Do you swear to tell the truth and nothing but the truth? The record should reflect that all those witnesses, all the witnesses participating have taken the oath. We will start with Mr. Partain. Mr. Partain, you are recognized for five minutes.

STATEMENT OF MICHAEL PARTAIN, MEMBER, ATSDR CAMP LEJEUNE COMMUNITY ASSISTANCE PANEL (CAP) AND BREAST CANCER SURVIVOR BORN ON CAMP LEJEUNE

Mr. PARTAIN. Thank you, Mr. Chairman and Ranking Member.

"You have male breast cancer" were the words which greeted me and my wife on our 18th wedding anniversary. My name is Michael Partain and I am the son and grandson of United States Marine Corps officers. My parents were stationed aboard Marine Corps Base Camp Lejeune shortly after my father graduated from the United States Naval Academy. I was conceived, carried and then born at the base Naval Hospital during the drinking water contamination period at Camp Lejeune.

Three years ago, I was diagnosed with male breast cancer at the age of 39. In fact, I am one of 64 men who share the unique commonality of male breast cancer and exposure to the contaminated water aboard Camp Lejeune. There is no history of the disease in my family, and I have tested negative for the hereditary breast cancer markers BRCA1 and BRCA2. I do not drink nor do I smoke.

The history of the Camp Lejeune drinking water contamination has been chronicled in many forms over the past 26 years. Currently, the Department of the Navy and the Marine Corps constantly beat a drum that the health, safety and welfare of their

Marines, sailors and families has been and always will be a top priority for the Marine Corps. Two months ago, the Marine Corps distributed an informational booklet detailing their version of the Camp Lejeune drinking water contamination to every Member of Congress. This booklet is a written testament to the mountain of lies and years of open deceit that the servicemen, the servicewomen and their families have endured since the drinking water contamination was first announced in December of 1984.

The initial warnings that Camp Lejeune's drinking water contamination began in October of 1980. A representative from the Navy's Atlantic Division, LantDiv, arrived at Camp Lejeune to collect composite samples to ensure there was no Love Canal present aboard the base. TCE and PCE were specifically detected in this base-wide composite sample. No further action was taken.

Later that month, an Army laboratory base out of Fort McPherson, Georgia, tested the tap water for Hadnot Point's water distribution system. The laboratory was unable to obtain accurate readings because of interferences in the samples and was apparently concerned enough to handwrite "water is highly contaminated with low molecular weight halogenated carbons." A series of warnings then ensued: "Heavy organic interference. You need to analyze for chlorinated organics" by GCMS, December 1980. "You need to analyze for chlorinated organics" by GCMS February 1981. "Your water is highly contaminated with chlorinated hydrocarbons," and then they put in parentheses in capital letters the word "solvents" with an exclamation point, March 1981. "Interferences on this peak" December 1981. No further action was taken.

Concurrently with the warnings from the Army lab, another problem was discovered at the base's rifle range water treatment plant. Something different occurred at the rifle range that did not happen at Hadnot Point. The rifle range water treatment plant and well fields were tested. The offending well was identified and action taken to eliminate the problem. Why the different standard of care?

Grainger Laboratory was the third laboratory to test Camp Lejeune's water. With their very first sample, the VOC contamination was again confirmed. The owner of the laboratory, who will testify later, informed the base chemist, Elizabeth Betz, that PCE and TCE were contaminating the tap water samples. The findings were reported up the chain of command, and 8 days later Mrs. Betz was summoned to a briefing with the Assistant Chief of Staff, Facilities, and his assistant. Ms. Betz stated in her memorandum for the record, "It appeared to me that they had not been informed about the findings. I did not inform them."

As a result of Mr. Hargett's efforts, the respective well fields for Tarawa Terrance were identified as the source of the contamination. Despite the immediate danger of exposure to the personnel on the base, no further action was taken.

Furthermore, a change order for the Navy environmental program was executed in December of 1982. Grainger's findings were not included in this change order. Nowhere in the 1983 initial assessment study for Camp Lejeune was there any discussion concerning the VOCs found by the three laboratories. Instead, the report concluded, "that while none of these sites pose an immediate threat to human health or the environment, 22 warrant further investigation on the Navy Assessment and Control of Installation Pollutants Program."

The leadership of the United States Navy and Marine Corps repeatedly assert that the chemicals found in the tap water at Camp Lejeune were not specifically regulated in the Safe Drinking Water Act. While this may be true, they consistently failed to recognize their own naval potable water regulation BUMED 6240.3b and 6240.3c which date back to 1963. These regulations contain a set of definitions to clearly specify the meaning of key terms used within the document. Three key terms illustrate and provide a clear understanding that the Marine Corps had the ability to protect their Marines and sailors and their families as early as 1963.

Health hazards as defined in the instructions means any conditions, devices or practices in the water supply system and its operation which create or may create a danger to the health and wellbeing of the water consumer. An example of a health hazard is a defect in the water supply system whether of location, design or construction which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources, as is the case at Camp Lejeune. Pollution is defined in the standards means the presence of any foreign substance organic, inorganic, radiological or biological in water which tends to degrade its quality so as to constitute a hazard to impair the users of the water. Chemical characteristics: substances which may have a deleterious physiological effect or for which the effects are not known shall not be introduced into the water system in a manner which would permit them to reach the consumer.

During the course of our research, we discovered an order issued by the commanding general of Camp Lejeune regarding organic solvents. Base Order 5100.13b was written to inform the general's command about the safe disposal of contaminants or hazardous waste. The order declared organic solvents as hazardous and that improper disposal of hazardous materials could lead to drinking water contamination.

Last year, the Marine Corps was asked by Senators Burr and Hagan from North Carolina whether the Marine Corps agreed that base order 5100.13b declared organic solvents hazardous. The official Marine Corps response signed by Brigadier General Regner was: "The 1974 Base Order speaks for itself."

Why the leadership of the United States Marine Corps failed to follow these orders and protect our health remains a mystery. Whatever happened to, we take care of our own. If the United States Marine Corps is so concerned about the health and safety and welfare of their Marine Corps family, then why is it so hard for them to tell the truth?

This quote appeared in a June 1984 article announcing the commencement of the confirmation study: "While contractors will routinely wear personal protective equipment such as chemical resistant overalls, we do not expect to expose anyone to contaminants. The results of the survey are due in August 1984. If any contaminations are discovered, a review of alternatives will determine action necessary to meet the health and environmental standards." What the article didn't tell the personnel on the base was that they were already exposed.

July 6, 1984, Hadnot Point well 602 was tested by a Navy contractor. Many of this contractor's subsequent reports are missing. However, their final report concluded that of extreme importance is the high level of benzenes, 380 parts per billion, detected in the sample collected from the deepwater well number 602. This benzene—I am sorry. The use of this well should be discontinued immediately. The well was closed in November of 1984. To date, the Marine Corps cannot produce any documentation, written documentation to show their notification that the well was contaminated.

December 1984, the first article appeared in the press about the announcement of the contamination. As a result of the water samples taken on December 3rd, not July 6th, four wells in the Hadnot Point industrial area were found to contain some traces of organic contamination. None of the compounds noted in the test samples are listed in the regulations under the Safe Drinking Water Act. Daily water samples are being taken from the water treatment plant to ensure drinking water remains within prescribed federal and state regulations established by the Safe Drinking Water Act. Every effort will be made to maintain the excellent quality of water supply provided to the residents of Camp Lejeune.

April 1985, notice from the commanding general to the residents of Tarawa Terrace. Two of the wells that supplied Tarawa Terrace have been taken offline because of minute trace amounts of organic solvents—sorry—organic chemicals have been detected in the water.

May 1985, a Marine Corps public affairs spokesman, Gunnery Sergeant Simmons, said he had no information on whether the well water was dangerous to humans. Simmons stated that while there were no State or Federal regulations that maintained an acceptable level of such contaminants in the drinking water, "we ordered the closure of all wells that showed even a trace amount."

September 1985, the base Environmental Engineer, Robert Alexander, was quoted in the paper as saying, "We sampled nearly wells and one near the fuel farm. We did not detect fuel but we detected organic solvents." And then he went on to say that no one had been harmed.

Chairman MILLER. I am sorry. Can you begin to wrap up?

Mr. PARTAIN. Okay. Also in September 1985, Mr. Alexander advised the residents of the base that no one had been exposed, directly exposed to the pollutants.

Is this how the leadership of the United States Marine Corps demonstrates their concern for the Marine Corps family?

Last year the ATSDR withdrew their flawed Public Health Assessment for Camp Lejeune due to benzene contamination. Prior to 2010, the United States Marine Corps admitted to losing up to 50,000 gallons at the Hadnot Point fuel farm during the 49-year history of the facility. That number has now changed to 1.1 million gallons of fuel released into the groundwater at Hadnot Point. Shortly afterwards—sorry. That number has now changed to 1.1 million gallons of fuel released into the groundwater at Hadnot Point. Last year, ATSDR stumbled across a previously undisclosed Navy electronic library. Also within this portal were documents detailing the former fleet refueling and service area with seven underground storage tanks located within 300 feet of well 602. We would like to know when the leadership of the United States Marine Corps and Navy were planning to inform ATSDR of these vital facts. Where was their written notification to ATSDR that 1 million gallons of fuel were released into the groundwater and the existence of the new fuel contamination at building 1115? As the old adage goes, actions speak louder than words. Trying to pin down the truth with the leadership of the Marine Corps is like trying to nail Jell-O to the wall.

In conclusion, our country has seen a renewed appreciation for our volunteer military and the sacrifices made by our fighting men, women and their families. It is hard to drive down the road without seeing a "Support the Troops" ribbon on someone's car. How can we profess a respect for our military personnel and families when in their time of need this country not only abandoned them but abandoned their families. We trusted the Marine Corps would do the right thing for the Marines and their families.

The subtitle of this hearing is "Looking Back, Moving Forward." We looked back and found the Marine Corps statements do not match the historical documents. We cannot move forward with understanding Camp Lejeune's drinking water contamination unless there is a full disclosure from the Navy Marine Corps. Congress is where this issue must be resolved. Our exposures are established and well documented. The negligence of the Marine Corps is clear. There are thousands of Marines, sailors, family members and base employees who were sickened by the foul water at Camp Lejeune. When will our country fulfill our commitment to support the troops?

Thank you, sir.

[The prepared statement of Mr. Partain follows:]

PREPARED STATEMENT OF MICHAEL PARTAIN

My Name is Michael Partain and I am the son and grandson of United States Marine Corps Officers. My parents were stationed aboard Marine Corps Base Camp Lejeune shortly after my father graduated from the United States Naval Academy. I was conceived, carried and then born at the base Naval Hospital while my parents lived in base housing. During the time of my mother's pregnancy, we were exposed to high levels of tetrachloroethylene (PCE), trichloroethylene (TCE), dichloroethylene (DCE), benzene and vinyl chloride in the tap water provided to my family by the Marine Corps. Three years ago, I was diagnosed with male breast cancer at the age of thirty nine. In fact, I am one of about sixty four men who share this unique commonality of male breast cancer and exposure to contaminated tap water aboard Camp Lejeune. There is no history of the disease in my family and I tested negative for the hereditary breast cancer markers BRCA 1 and 2. I do not drink nor do I smoke.

The history of the Camp Lejeune drinking water contamination has been chronicled in many forms over the past twenty six years since the first announcement made by the United States Marine Corps revealing the existence of drinking contamination problem aboard the base. Currently, the Department of the Navy and the Marine Corps beat a constant drum that the health, safety and welfare of their Marines, Sailors and their families has been and always will be a top priority for the Marine Corps[1]. In July of this year, the USMC distributed an informational booklet on the Camp Lejeune drinking water contamination to every member of Congress. This booklet is a testament to the mountain of lies and years of open deceit the service men, women and their families have endured since the drinking water contamination was first revealed.

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[1] USMC Camp Lejeune Historic Drinking Water Q&A Booklet, USMC July 2010.

Discovery of Camp Lejeune's Drinking Water Contamination.

The recent Marine Corps informational booklet first describes the discovery of the Volatile Organic Compound (VOC) problem at the base in the Executive Timeline by stating that "unidentified VOC's interfered with total trihalomethane (TTHM) testing between 1980–1982.[2] A few pages later, the reader then discovers that "targeted" sampling in August 1982 identified the contaminants as tetrachloroethylene (PCE) and trichloroethylene (TCE). The reader is then told the chemicals were unregulated by the Safe Drinking Water Act at the time.[3] A careful examination of Marine Corps and Navy documents reveal a totally different scenario unfolded at Naval Facilities and Engineering Command (LantDiv) and the base after the initial warnings about the contamination poisoning the drinking water surfaced.

On 1 October 1980 a representative from LantDiv arrived at Camp Lejeune to collect a composite sample from all eight water treatment plants in an effort to ensure there was no "Love Canal" present aboard the base.[4] Seven months prior to this visit, the State of North Carolina assumed primacy for the enforcement of the Safe Drinking Water Act.[5] Officials at LantDiv were worried that the State might find a problem with Camp Lejeune's water that the Navy had not previously uncovered. If a problem was discovered, then further analysis of the eight individual systems would be done to locate the source of the problem.[6] The results from the composite sample were released to LantDiv on 31 October 1980 and the composite samples showed contamination of the drinking water from PCE, TCE, dichloroethylene (DCE), and vinyl chloride just under the detection limits set for the laboratory.[7] According to the Base Supervisory Chemist, Elizabeth Betz, these results were not received at Camp Lejeune until June 1982. Ms. Betz documented in her memorandum for the record that she did not know how LantDiv determined the amount of water to take from each system to comprise the volume used in making the composite sample. Betz also recognized the percentage of total volume did not accurately reflect the corresponding usage for each system sampled or the daily flow of each system. Ms. Betz ominously noted that the 1980 analysis showed no problems for the priority pollutants listed for the eight water treatment systems aboard Camp Lejeune as a whole, but the same may not necessarily be true for each individual water treatment system aboard the base.[8] No further investigation was initiated.

The second laboratory to find contamination in Camp Lejeune's drinking water was the U.S. Army Environmental Hygiene Agency (USAEHA lab) located in Ft. McPherson, Georgia. The laboratory was tasked by LantDiv to sample Camp Lejeune's treated water for an upcoming EPA regulation concerning dangerous compounds formed during the treatment of potable water known as trihalomethanes (TTHMs). The initial samples were collected on 21 October of 1980 and the sample was read on 31 October 1980. The water system sampled was Hadnot Point and the sampling included a sample collected from the Naval Hospital's emergency room sink. The Laboratory Chief, William Neal, was apparently concerned enough to take the time to hand write:

> "***Water is highly contaminated with low molecular weight halogenated hydrocarbons***"

upon the analytical sheet delivered to LantDiv.[9] This initial warning began a series from the USAEHA laboratory about the treated water produced by the Hadnot Point water treatment plant (WTP). These warnings took place between October 1980 through December 1981.

1. ***"Heavy Organic Interference at CHCL2BR, You Need to Analyze for Chlorinated Organics by GCMS.***"[10]
2. ***"You need to Analyze for Chlorinated Organics by GC/MC***."[11]

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[2] USMC CL Booklet page 4.

[3] USMC CL Booklet page 6.

[4] Camp Lejeune Water (CLW) USMC document 1818, Pdf page 2, April 1989. These documents are found on an electronic library from ATSDR in the form of DVD discs accompanying the release of the Tarawa Terrace Water Model in 2007.

[5] CLW 425, March 1980.

[6] CLW 613, August 1982.

[7] 430 October 1980 and CLW 613 August 1982.

[8] CLW 613 August 1982.

[9] CLW 436, October 1980.

[10] CLW 438, January 1981

[11] CLW 441, February 1981

3. ***"Water Highly Contaminated with other Chlorinated Hydrocarbons (SOLVENTS)!"*** [12]
4. ***"Interferences on this Peak (CHCL2BR)."*** [13]

Concurrently with the warnings from the USAEHA lab, another problem was discovered at the base's Rifle Range water treatment plant (WTP). Potable water sampling was initiated at the Rifle Range WTP in 1981 at the request of LantDiv. The tests were ordered in response to concerns about the water system's location to a nearby chemical dump.[14] This chemical dump was registered with the EPA and had been in operation from sometime in 1959 until 1976.[15] Between March and May of 1981 a series of potable water sampling revealed a similar organic contamination within the Rifle Range water distribution system. The findings precipitated a letter from LantDiv in July of 1981 which stated that Rifle Range well RR–97 contained low levels of organic contamination and two other wells were to be operated in preference to well RR–97.[16] The Commanding General of Camp Lejeune then wrote the State of North Carolina and informed the state regulators that:

> "***based on the laboratory analyses mentioned above and on-site inspections of the landfill and the Rifle Range system, LANTNAVFACENGCOM (LantDiv) officials have concluded that the Rifle Range drinking water meets current drinking water standards***."

There was no mention to the State of the organic contamination found at the Rifle Range potable water system between March 1981 and May 1981.[17] During this time, no known testing was performed on any of the 35 Hadnot Point potable water supply wells despite concurrent warnings from the USAEHA laboratory that Hadnot Point treated water was highly contaminated with (SOLVENTS)! Surprisingly, LantDiv did have prior experience with VOC/organic contamination problems within Naval owned and operated water distribution systems. One year prior to the discovery of VOCs in Camp Lejeune drinking water systems, two Naval installations experienced PCE and TCE contamination. However, something different occurred at Warminster Naval Air Warfare Center and Willow Grove Naval Air Station. The contaminated wells producing PCE and TCE in the base's drinking water were identified and closed.[18] Why did the Navy fail to implement testing of the potable water wells for each water distribution system aboard Camp Lejeune after the first indication of contamination was discovered? Why was the Rifle Range potable water distribution system treated differently from the Hadnot Point potable water distribution system? At the time of the testing in 1981, the Rifle Range WTP served only a few permanent houses and Marines temporarily training at the range. During this same time, the Hadnot Point WTP served the what is known as Main-side which included the base barracks, the Naval Hospital, and with that thousands of Marines, Sailors and their families. Where was the Marine Corps' concern for the health, safety and welfare for their Marines, Sailors and their families?

By the Fall of 1981, the USAEHA laboratory experienced an equipment breakdown which resulted in a back log of work from Camp Lejeune and other Department of Defense installations.[19] A replacement laboratory was needed and a state certified laboratory was selected to continue Camp Lejeune's mandated TTHM testing. Grainger Laboratory was owned by Fred Grainger and Mike Hargett. The laboratory entered into a contract with Camp Lejeune to test the Tarawa Terrace and Hadnot point WTPs for TTHMs. This testing did not include testing for VOCs. The first sample for each of the distribution systems was collected in late April of 1982. The samples were analyzed for TTHMs, and as was the case with the USAEHA lab, solvents were found not only in the Hadnot Point samples but also in the newly tested Tarawa Terrace water distribution system. Mr. Hargett then contacted Camp Lejeune's Base Supervisory Chemist, Elizabeth Betz, and informed her that the synthetic organic cleaning solvents PCE and TCE were found in both samples submitted for both Handot Point and Tarawa Terrace. Ms. Betz then reported the findings to her supervisor, Danny Sharpe who then pushed them up the chain of command which included the base Utilities director Fred Cone. Eight days later, Ms. Betz briefed Col Millice, Assistant Chief of Staff, Facilities, and LtCol. Fitzgerald about the April TTHM test results. Ms Betz stated in her memorandum for the record that:

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[12] CLW 443, March 1981

[13] CLW 5739, December 1981, PDF page 2.

[14] CLW 5791, July 1981.

[15] Comprehensive Environmental Response, Compensation and Liability Act (Cercla) document 226, Pdf page 13, March 1982. These documents are found on an electronic library from ATSDR in the form of DVD discs accompanying the release of the Tarawa Terrace Water Model in 2007.

[16] CLW 3757, Pdf page 3, July 1981.

[17] CLW 6124, Pdf page 1, August 1981.

[18] Public Health Assessments for Willow Grove NAS and Warminster Naval Air Warfare Center, The Agency for Toxic Substance and Disease Registry, 2002.

[19] CLW 468, Pdf page 2, February 1982.

> "***It Appeared to me that they had not been informed about the findings, I didn't inform them.***" [20]

Later that same month, a second series of samples were taken from the Hadnot Point and Tarawa Terrace water distributions systems. This time there was a problem with the caps for the samples taken. However, Mr. Hargett advised Ms. Betz the solvents noted on the 6 May phone call were still present.[21] A second Grainger contract was written in July 1982 for additional testing of four samples taken from the water treatment plants for Tarawa Terrace and Hadnot Point. The first set of samples were collected from the raw water line which fed each plant from a distinct well field. The second set of samples were collected from the respective plant's reservoir containing treated water.[22] The results of this special testing for the Hadnot Point and Tarawa Terrace WTPs were compiled in a formal letter to the base on 10 August 1982 by Grainger Laboratory chemist Bruce Babson. Mr. Babson wrote the Assistant Chief of Staff, Facilities:

> "***Interferences which were thought to be chlorinated hydrocarbons hindered the quantification of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejeune personnel.***" [23]

Mr. Babson also concluded that the well fields for the WTPs were the source of the contamination found in the water treatment plants. He identified the contaminants as PCE and TCE.[24] Disturbingly, Grainger Laboratory quantified TCE in a sample taken from the Camp Lejeune Naval Hospital at 1,400 ppb. Instead of immediate action to test each and every potable water well for VOCs/organic and ensure the health, safety and welfare of the service personnel and their families aboard Camp Lejeune was protected, an excuse was given to explain away Grainger's confirmation of what the USAEHA and Jennings Laboratories both found in the potable water samplings from October of 1980.

According to the recent USMC informational booklet for the Camp Lejeune Historic Drinking Water problem:

> "***Base officials compared these results against EPA recommended levels and found the average levels of TCE and PCE were within those levels and thus not thought to be a health concern.***" [25]

The immediate problem with the current Marine Corps rendition of why no further action was taken after Grainger's warnings is that their assertion that the TCE and PCE levels were within the EPA's recommended levels is not true. The Base Supervisory Chemist, Elizabeth Betz noted in her findings that the levels of PCE at Tarawa Terrace exceeded the EPA's recommended level of 40 ppb for long term exposures. Furthermore, the May TCE reading of 1,400 ppb taken from the Emergency Room sink of the base Naval Hospital was summarily dismissed with no explanation offered to explain the existence of the extreme levels of the chemical found in the sample or why the levels dropped to 20 ppb in subsequent testing. Only by arbitrarily dismissing the May 1,400 ppb TCE value does the Hadnot Point sampling fall into line with the EPA's recommended values for chronic exposure to TCE.[26] Three months after Betz's August 1982 memorandum for the record, the base performed the quarterly testing for TTHMs and sent the samples to Grainger Laboratory. Once again the analytical data sheets noted interference in the samples from Tarawa Terrace and Hadnot Point.[27] Ms. Betz then called the Grainger Chemist, Bruce Babson to discuss a typographical error on his report. Mr. Babson then expressed his concern that the solvents which interfered in Hadnot Point's testing which had previously dropped were relatively high again.[28] Ms. Betz memorandum was forwarded to the Assistant Chief of Staff, Facilities and then on to the newly hired base Environmental Engineer, Robert Alexander.[29] From that point on, the prolific note keeping and memorandums written by Elizabeth Betz inexplicably cease.

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[20] CLW 5176, Pdf page 5, May 1982.

[21] CLW 564, June 1982.

[22] CLW 589, July 1982.

[23] CLW 592, August 1982.

[24] CLW 592, August 1982.

[25] USMC CL Booklet, Page 7, July 2010.

[26] CLW 606, Pdf page 2, August 1982.

[27] CLW 5183. Pdf page 25, December 1982.

A prior flawed Government Accountability Office (GAO) sponsored investigation into the Camp Lejeune drinking water contamination cited entirely different reasons why the base failed to act after Grainger's warnings in August 1982:

> "***they had limited knowledge of these chemicals; second there were no regulations establishing enforceable limits for these chemicals in the drinking water; and third they made assumptions about why the levels of TCE and PCE varied and about the possible sources of the TCE and PCE.***"
>
> "***Specifically, because the levels of TCE and PCE varied, they attributed the higher levels to short term environmental exposures, such as spilled paint inside a water treatment plant, or to laboratory or sampling errors. Additionally, in an August 1982 memorandum, a Camp Lejeune official suggested that, based on the sampling results provided by the private laboratory, the levels of PCE detected could be the result of using coated pipes in the untreated water lines at Tarawa Terrace***.[30]

Missing from the GAO's limited review of the Camp Lejeune document inventory are two key documents which undermine the validity of the GAO investigation. The first document is an unusual Base Order written in 1974. Unlike most military orders, there are no references indicating on what authority or guidance the general issued the order. Base Order 5100.13B was written to inform the general's command about the "Safe Disposal of Contaminants or Hazardous Waste." What is significant about this order was that it clearly demonstrated that the Marine Corps knew at least by 1974, or perhaps earlier if the prior copies of this order are ever found:

- **Organic solvents were hazardous materials, and**
- **Improper disposal practices create hazards such as the contamination of drinking water.**

The designated disposal sites were the dumps located at the Rifle Range.[31] Last year the Marine was asked by Senators Burr and Hagan from North Carolina whether the Marine Corps agreed that Base Order 5100.13B declared organic solvents hazardous. The official Marine Corps reply signed by Brigadier General Regner was:

> "***The 1974 Base Order Speaks for itself***." [32]

The second document was a set of potable water instructions dating back to 1963. The instructions are known as BUMED 6240.3B (1963) and revision 3C (1972). The Bureau of Medicine and Surgery (BUMED) was the entity within the Department of the Navy responsible for setting potable water standards for the Navy. While there were no set specific standards for VOCs/organic solvents within the instruction, there were preventive measures and requirements that if followed should have led to the disqualification for use, of most if not all, of the contaminated wells found at Camp Lejeune. The regulations contained a set of definitions to clearly specify the meaning of terms used within the document. Three key terms illustrate and provide a clear understanding that the Marine Corps had the ability to protect their Marines, Sailors, and families as early as 1963.

> **Health Hazards** means any conditions, devices or practices in the water supply system and its operation which create, or may create, a danger to the health and well-being of the water consumer. An example of a health hazard is a structural defect in the water supply system whether of location, design, or construction, which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources.
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> **Pollution** as used in these standards, means the presence of any foreign substance (organic, inorganic, radiological, or biological) in water which tends to de-

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[28] CLW 698, December 1982.

[29] CLW 703, January 1983.

[30] Report Defense Health Care: Activities related to Past Drinking Water Contamination at Marine Corps Base Camp Lejeune, Government Accountability Office, Pdf Page 30, May 2007.

[31] CLW 5996, Pdf page 2, June 1974.

[32] USMC Response to Senator Burr and Hagan Queries on Camp Lejeune, Pdf page 3, July 2009.

> grade its quality so as to constitute a hazard or impair the usefulness of the water.
>
> **Chemical Characteristics** Drinking water shall not contain impurities in concentrations which may be hazardous to the health of the consumers. It should not be excessively corrosive to the water supply system. Substances used in its treatment shall not remain in the water in concentrations greater than required by good practice. Substances which may have deleterious physiological effect or for which physiological effects are not known, shall not be introduced into the system in a manner which would permit them to reach the consumer.[33]

To date, the Marine Corps has failed to provide Congress, the media and their Marines, Sailors and their families with a clear answer as to why these orders were not reviewed in the Commandant's Blue Ribbon panel and why the Navy's BUMED 6240.3B and 3C regulations were not followed. Four years after the closure of Hadnot Point well HP 602, the BUMED 6240.3C order was canceled and revised with NAVMEDCOMIST 6240.1. Missing from the new instructions were the definitions for Health Hazards, Pollution and the strong language found within the Chemical Characteristics section of BUMED 6240.3B and C. The new regulations replaced what was then a more advance and comprehensive potable water standard with a new standard which was in agreement with the Safe Drinking Water Act.[34] The existence of Base Order 5100.13B married with BUMED 6240.3B and C meant that the Marine Corps possessed at least an operational knowledge that organic solvents and other hazardous materials could and did contaminate the groundwater aboard Camp Lejeune as early as 1974 and as such their groundwater wells were vulnerable. Another word for this type of knowledge and lack of due care is called gross negligence.

The other fallacy cited above and contained in the GAO report was the assertion that vinyl lined asbestos coated pipes were the possible source for PCE contamination for the base. The basis for this fallacy is contained in a memorandum written by Elizabeth Betz asserting her opinion that she believed the contamination was possibly the result of vinyl line asbestos coated pipes in the raw water lines at Tarawa Terrace.[35] The basis for this assumption was apparently due to a 9 April 1980 EPA bulletin which cited vinyl lined asbestos coated pipes as a source for drinking water contamination. The EPA also noted that their suggested action guidance did not condone the presence of any level of PCE contamination in drinking water.[36] The problem with Betz's conclusion was that according to base construction records, no vinyl lined asbestos coated pipes were ever used in any of the base's potable water distribution systems.[37]

Shortly after the Bruce Babson's August Grainger Laboratory report arrived on the desk of the Assistant Chief of Staff, Facilities, a draft copy of the Navy's Naval Assessment and Control of Installation Pollutants (NACIP) Initial Assessment Study (IAS) for Camp Lejeune arrived as an attachment to a 5 August 1982 letter from Wallace Eakes of LantDiv to Col Marshall at Camp Lejeune. Mr. Eakes requested Col. J. T Marshall, Assistant Chief of Staff, Facilities to review the Draft IAS for completeness, accuracy and concurrence for recommendations no later than 25 August 1982.[38] Col. Marshall completed his assigned task and replied on 25 August 1982. Contained in his comments for the Draft IAS:

> "***It is important to note that accuracy of the data provided by U.S. Army Laboratory is questionable. It is recommended that TTHM information be de-emphasized throughout the report***." [39]

There was no mention of the August 1982 Grainger letter confirming the U.S. Army laboratory's findings from October 1980 and warning him that the potable water for Hadnot Point and Tarawa Terrace was highly contaminated with VOCs/Organic solvents in the Colonel's 25 August reply to LantDiv. Four months later a change order to the IAS was executed to include two new disposal sites located on the base after the IAS team departed in March 1982. The base's potable water contamination was not mentioned in the change order, nor were there any requests made to test the wells for Hadnot Point and Tarawa Terrace to locate the specific wells with VOC/Organic solvent contamination.[40]

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[33] CLW 144, December 1972

[34] Naval Medical Command Instruction 6240.1, Naval Military Personnel Command, December 1988.

[35] CLW 5176, Pdf page7, August 1982.

[36] CLW 391, April 1980.

[37] CLW 3884, Pdf page 4, September 1982

[38] CLW 6332, Pdf page 3, August 1982.

[39] CLW 6332, Pdf page 2, August 1982.

The Initial Assessment Study for Camp Lejeune was released in April of 1983 and listed 76 potentially contaminated sites aboard the base and 22 of these sites warranted further investigation in the form of a Confirmation Study phase of the NACIP program.

> "***The Study concludes that, while none of the sites pose an immediate threat to human health or the environment, 22 warrant further investigation under the Navy Assessment and Control of Installation Pollutants (NACIP) Program to assess potential long-term impacts. A confirmation study is recommended to confirm or deny the existence of the suspected contamination and quantify the extent of any problems which may exist***." [41]

Nowhere in the 221 page document were there any recommendations to test any of the potable water wells for Tarawa Terrace and only 2 out of 35 wells were recommended for testing at Hadnot Point.[42] How could the official Navy environmental (NACIP IAS) study for Camp Lejeune conclude there was no immediate threat to human health aboard the base if the report failed to address the Army and Grainger laboratory's findings of VOC/Organic solvents in two of the base's potable water system? A month after the release of the IAS, LantDiv Environmental Engineer and Engineer in charge of the Confirmation study for Camp Lejeune wrote a letter apparently addressing the ongoing VOC/Organic solvent contamination aboard the base. Unfortunately, that letter has since vanished. Sixteen years later the Wallmeyer letter, as it has since come to be known, was the subject of a four week document search at LantDiv.[43] The letter was reportedly never found. According to a subsequent reference in a message from April of 1985, the Wallmeyer letter attempted to address the VOC/Organic Solvent contamination problem with the base's potable water system.[44] The problem was that the official Confirmation Study did not include any of the measures described in the message referencing the Wallmeyer letter. Was LantDiv attempting to quietly remediate the VOC/Organic solvent drinking water contamination without full disclosure of the problem to the State and Federal agencies?

As part of our investigation into what transpired aboard Camp Lejeune prior to the official announcement of the drinking water contamination in December 1984, we located and interviewed Mike Hargett and Bruce Babson, both formerly of Grainger Laboratory. Curiously, neither of them were ever contacted by either the GAO or the Commandant's investigations into the Camp Lejeune drinking water contamination. Mr. Hargett informed me that he had been asked by the Base Supervisory Chemist to accompany her in a meeting to explain the significance of Grainger's findings. Mr. Hargett stated that the meeting lasted less than five minutes before they were dismissed. Frustrated by the Marine Corps' recalcitrance, Mr. Hargett then tipped off the State of North Carolina about the problems with the base's potable water system. In June of 1983, a letter from the State's environmental engineer, Mr. Elmore, arrived on Col. Marshall's desk requesting the original copies of Grainger's analytical data sheets instead of the tables summarizing them previously submitted by the Marine Corps.[45] The analytical data sheets were exclusive property of the Marine Corps and written upon them were Bruce Babson's warnings that PCE and TCE were interfering with the TTHM testing. Six months later this request was formally denied by the new Assistant Chief of Staff, Facilities, Col. Lilley. Col. Lilley advised Mr. Elmore that the original reports were not required and thus not submitted to the state.[46] Sadly, the State of North Carolina agreed with the Marine Corps assertion and another opportunity to stop the drinking water contamination aboard Camp Lejeune slipped by and was forgotten. Bruce Babson's notations and warnings were toned down but the asterisk notating interferences with the TTHM testing remained on almost every known Grainger Laboratory analytical data sheet through the Summer of 1984. Ironically, it was another contamination problem with a different chemical which forced the VOC/Organic solvent drinking water contamination issue to the surface. When it did surface, the

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[40] Cercla 2059, December 1982.

[41] CLW 709, Pdf page 3, April 1983.

[42] CLW 709. Pdf page 29, April 1983.

[43] CLW 3039, Pdf pp 5&6, February 1999.

[44] CLW 1195, April 1985.

[45] CLW 940, June 1983.

[46] CLW 6348, December 1983.

VOC/Organic solvent drinking water contamination was subsequently used to hide a more sinister contaminant, benzene.

Massive fuel leaks at the Hadnot Point Fuel Farm.

The Hadnot Point Fuel Farm (HPFF) was constructed on the Southeast corner of Holcomb Blvd and Ash Street sometime in 1941. The fuel farm was comprised of fourteen fuel tanks buried in the ground and one large 600,000 gallon tank located above ground. The fuel farm was located in what is now known as the Hadnot Point Industrial area and within 1,200 feet from potable water well HP–602 which was also constructed in 1941.[47] The first documented fuel leak at the HPFF occurred in 1979 when an estimated 20,000 to 30,000 gallons of fuel leaked from an underground valve.[48] A condition survey for the HPFF was scheduled the following year and other problems were found at the HPFF. The LantDiv engineer concluded that because of age, failure to clean the tanks, and lack of maintenance, there had been a general condition of corrosion and deterioration of the tanks and connecting pipelines. Many of the interconnecting valves and flanges could not be inspected because they were buried and/or could not be located. The engineer recommended replacing the connecting piping, the inspection of all of the tanks for leaks and repair existing leaks.[49] The Condition Survey was followed in 1981 with a Military Construction Data project number LE201M to repair the HPFF facilities and $537,200 was then allocated to clean and repair the petroleum tanks.[50] By March of 1983, Navy and Marine Corps officials determined that piece meal rehabilitation of the HPFF was not cost effective and in 1985, the recommendation was made to replace the HPFF with a new facility.[51] The fuel farm was finally replaced in 1990.

There are no known records indicating that the Marine Corps made any attempt to remediate the 20,000 to 30,000 gallon 1979 fuel leak between 1980 and 1988. In May 1988 correspondence, the Assistant Chief of Staff, Facilities finally notified the State of North Carolina that a 15 foot thick fuel plume was contaminating the groundwater underlying the bulk fuel facility.[52] The base Staff Judge Advocate, Col. Tokarz, noted that the fuel farm was losing fuel into the groundwater at the rate of 1,500 gallons per month. The colonel also warned that delays will result in an indefensible waste of money and a continuing threat to human health and the environment.[53]

Knowing the existence of a massive 20,000–30,000 gallon fuel leak in 1979 which drained into the ground at the Hadnot Point Industrial area with no attempts to remediate or recover the lost fuel until at least 1989, leads a rational, prudent person to speculate why it took the Marine Corps five years to sample the nearest potable water well (HP–602) to ensure the well was free of fuel contamination. After all, BUMED 6240.3B and version C carried an obligation for the Marine Corps to make sure potable water was obtained from the most desirable source feasible and efforts be made to prevent or control pollution of the source.[54] Where are the documents detailing these required efforts? Instead, the Marine Corps relies on their assertion that VOCs, including the SVOC benzene, were not regulated by the Safe Drinking Water Act until the late 1980's and early 1990's to avoid addressing the issue.[55] Does there have to be a set standard or maximum containment level for a polluter to be negligent in their duties to protect human health? Where does common sense enter into the equation? Prior to 1984, there are no known records indicating that the Marine Corps took any action to protect the water supply for well HP–602 from fuel contamination and consequently the entire Hadnot Point water distribution system.

One of the few potable water wells selected for sampling by the Navy's NACIP program was well HP–602. The 1982 draft copy of the IAS report stated that well HP–602 was designated for sampling in the Confirmation study because it was located 1,100 feet down-gradient from the HPFF and actively pumping.[56] The final IAS report released in April 1983 detailed the fuel losses for the HPFF totaled somewhere between 20,000 to 50,000 gallons of fuel. This figure became the basis for the fuel loss estimates for the public, Congress and more importantly, the Agency for Toxic Substances and Disease Registry (ATSDR), the agency tasked with studying the health effects resulting from the potential exposures at Camp Lejeune. This misconception remained until 2010 when it was discovered that the fuel losses at the HPFF amounted to much more than what was previously disclosed by the Navy and the Marine Corps. Once again a reference from the current Camp Lejeune informational brochure is appropriate. According to the Marine Corps:

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[47] Cerlca 417, Pdf page 5, December 1988.
[48] CLW 709. Pdf page 133, April 1983.
[49] Cercla 96, Pdf pp 11–16, June 1980
[50] Cercla 96, Pdf page 17, March 1981.
[51] Cerlca 96, Pdf page 29, August 1989.
[52] Cercla 96, Pdf page 30, August 1989.
[53] Cercla 96 Pdf page 34, March 1988
[54] CLW 144, Pdf page 3, August 1972.
[55] USMC CL Booklet, page 8, July 2010.
[56] Cercla 332, Pdf page 52, June 1982.

> "***Question: Has the Marine Corps intentionally withheld information from ATSDR in order to delay their studies?***
>
> ***Answer: No. The Marine Corps has made extraordinary efforts to provide ATSDR access to any potentially relevant information we control. We recognize that this issue deals with complex science, and we have been working with ATSDR to get our former residents the answers they deserve in a timely manner.***
> ***The Marine Corps does not benefit in any way from delays to ATSDR's work. The people who were exposed are our family members and fellow Marines. We are much as anyone, want to be able to give them accurate answers in a timely manner.***"[57]

In March of last year, the ATSDR stumbled across a previously undisclosed web portal belonging to the Navy. A sub contractor to ATSDR was inadvertently given access to this portal by a Marine Corps' librarian. Contained within the NavFacEngCom's Underground Storage Tank (UST) web portal were documents previously withheld from the ATSDR including details on the size and scope of the fuel loss from the Hadnot Point Fuel Farm underground storage tanks. According to documents discovered in the portal, the Marine Corps lost 1.1 million gallons of fuel at the HPFF over the course of the 49 year operational history of the facility. Much of this fuel was located within 300–1,100 feet away from well HP–602. The fuel was found at all levels in the aquifer including the deep aquifer.[58] Where is the Navy's notification to ATSDR advising them of the existence of this portal and the 1.1 million gallons of fuel trapped in the ground at Hadnot Point? What does the Navy and the Marine Corps stand to gain if the public, the scientists and Congress were not aware of the extreme nature of the loss fuel at the HPFF?

The Confirmation Study for Camp Lejeune commenced in May of 1984 with the release of the Work and Safety Plan. The work plan detailed how and where the sampling for the Confirmation Study was executed. The plan also detailed the schedule of the project and what reports were required by the contractor. The contractor was an Environmental Engineering firm from Gainesville, Florida known as Environmental Sciences Engineering (ESE). A monthly progress report was required by the 15th day of each month for the duration of the contract. The tests results were scheduled to be evaluated between June and August and a draft report prepared by the end of August. The Final report was scheduled to be completed by 10 September 1984 and the presentation made on the same date.[59] According to the May/June progress report, work was underway and 14 ground water monitoring wells were installed. The engineer noted a one week delay due to decontamination of equipment.[60] The June/July progress report advised the LantDiv engineer in charge of the Confirmation study that 36 of 75 wells (this number included monitoring wells drilled for the study) were sampled. The sampling included site 22, the Hadnot Point Fuel Farm and well HP–602 (sampled 6 July 1984). A two week delay was noted due to equipment problems and the re-drilling of five new wells to replace wells inadvertently contaminated by an ESE subcontractor. The project was scheduled for completion on 4 August 1984. The samples were shipped to ESE laboratory in Gainesville, Florida for analysis.[61] After the 15 July progress report all documentation regarding ESE's efforts on the Confirmation Study ceased until January of 1985. The August progress report and all subsequent progress reports are missing, as is the draft report summarizing the evaluation of data from the sampling.

The only clue to what transpired during the missing months between July 1984 and December 1984 recently surfaced a few months ago when we located a State of North Carolina document written by Rick Shiver, N.C. Regional Hydrologist. The document was titled *Groundwater Pollution Source Inventory* and discussed the HPFF and the multiple leaking underground storage tanks (UST). The inventory is dated 1 August 1984 and located in the groundwater pollution box is a handwritten circle indicating that the groundwater pollution was confirmed.[62] At the time of this report, the State of North Carolina was supposedly not privy to the details of the Confirmation Study then underway at Camp Lejeune. The contractor was not required and did not report their findings to anyone else but the Navy personnel at LantDiv. What basis did Mr. Shiver have to conclude that the groundwater at the HPFF was contaminated with gasoline three months before the Marine Corps allegedly received ESE's Confirmation Study report revealing fuel contamination at the HPFF and potable well HP–602.

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[57] USMC CL Booklet, page 18, July 2010.

[58] Excerpt from Document #1185. This document was found by ATSDR within the recently discovered limited access web portal for the Navy's Underground Storage Tank Program, NavFacEngCom.

[59] Cerlca 337, Pdf page 33, May 1984.

[60] Cercla 3428, June 1984.

[61] Cercla 3429, July 1984.

Last year Senators Burr and Hagan posed a series of questions about Camp Lejeune to the Marine Corps. One of these questions asked why the Navy and Marine Corps waited until 30 November 1984 to close well HP–602. The Navy/Marine Corps replied:

> "***According to the record, the Marine Corps did not "wait" to shut down well HP–602. Well HP–602 was taken out of service as of 21 November 1984 as part of the normal rotation of well (CLW 1089). Records indicate that the results from the 6 July 1984 sample were received by the base on 30 November 1984 (CLW 4546). Upon receipt of the sample results, well HP–602 was never reactivated and was permanently taken out of service.***" [63]

The document titled CLW 1089 is a Question and Answer sheet prepared for the base Environmental Engineer, Robert Alexander in advance of a media interview concerning the contamination found at Camp Lejeune. Judging from the context of the document, mainly the omission of well HP–651 discovered contaminated in February 1985, the document was most likely written in December 1984. Mr. Alexander stated that benzene and industrial solvents were found in well HP–602 and then cited test results implying they were the results which closed well HP–602 in November of 1984. In fact, the test results on the Q&A sheet were collected on 3 December 1984, after the 30 November 1984 date in which the Marine Corps states that the base was allegedly notified that well HP–602 was contaminated and then closed. This mischaracterization of why well HP–602 was closed remained a fact until 2009. Mr. Alexander then wove a false sense of security for those potentially exposed by informing the community that all of the wells were located in the industrial area approximately 1 mile from the barracks.[64] Did this mean that the wells only served the shops and offices in the industrial area and not the barracks? If well 602 was closed as a result of the receipt of ESE's Confirmation Study results, then why was the July 1984 380 ppb finding omitted from the Q&A sheet? If well HP–602 was taken off line due to a normal rotation, then where are the well and plant production log books to support the Navy/USMC position? To date, the log books are all missing from the historical record for Camp Lejeune. The Navy and Marine Corps also cite CLW 4546 as evidence that they closed well HP–602 upon receipt of the ESE Confirmation Study. The document was written after the Bob Alexander Q&A sheet and at least three months after well HP–602 was closed.[65] The lack of primary supporting evidence on how the contamination at Hadnot Point was discovered is extremely disturbing. Why is everyone trusting the very entity who polluted the drinking water aboard Camp Lejeune to tell and not show us how it happened? Where is the November transmittal sheet for the ESE Confirmation Study? Where is the draft ESE Confirmation Study due in August 1984? Where is the telephone record log or memorandum to the base ordering them to close well HP–602 on 30 November 1984? Why was the Hadnot Point WTP tested for benzene only after the contaminated well was closed? Where are the missing progress reports from ESE? Where are the missing well and plant production log books? Every shred of evidence which would either condemn the Navy and Marine Corps or exonerate them is missing. Why?

A December 1984 base news paper article assured their readers that none of the organic compounds found in the base's water were listed under the Safe Drinking Water Act. The article ended with a chilling quote from the base environmental engineer, Robert Alexander:

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[62] North Carolina Groundwater Pollution Inventory, Rick Shiver, August 1980

[63] USMC Response to Senator Burr and Hagan Queries on Camp Lejeune, Pdf page 11, July 2009.

[64] CLW 1089, December 1984.

[65] CLW 4546, February 1985.

> "***Every effort will be made to maintain the excellent quality water supply traditionally provided to the residents of Camp Lejeune.***" [66]

Finally on 8 January 1985 a memo from LantDiv indicated that the Navy agreed to officially look at the other systems on the base for possible drinking water contamination. ESE, the Confirmation Study contractor was then assigned the task to sample all of the wells on the base for VOCs.[67] The ESE Evaluation of Data Report was released a week later. According to the project schedule previously discussed, the report was due in September 1984 and was four months late. Within the report, ESE indicated that there was extensive fuel contamination at the HPFF. The contractor wrote in their report:

> "***Of extreme importance is the high level of benzene (380 ppb) detected in the sample collected from the deep water supply well No. 602 (Well 22GW3). This benzene concentration far exceeds the 10 to minus 5 human health risk limit of 6.6 ppb; therefore, the use of this well should be discontinued immediately.***"

On the margin a curious handwritten from an unknown LantDiv official note reads:

> "***We must send them our (1141's) report on well data, what it means and what wells to keep shut down.***"
>
> "***The absence of contamination at Well 22GW2 indicates that the migration pathway is deep and not shallow.***" [68]

The Evaluation of Data report did not discuss the VOCs found in Tarawa Terrace beginning in 1982 and no wells in that system were sampled during the July 1984 testing period. The report also noted that subsequent to the July 1984 testing, well HP 602 experienced a dramatic increase in organic solvents after further testing by LantDiv. They concluded that the main industrial area was a logical source of the solvents.[69] This industrial area included the HPFF, the base maintenance shops, and building 1115 (the former Fleet Refueling and Service area). Also included in the industrial area were several water supply wells, among them was well HP–602. These wells all served the Hadnot Point WTP and were a source of drinking water for the service men, women and their families living within the treatment plant's service area. Later that year, when the State of North Carolina asked for copies of the ESE report, the Marine Corps refused:

> "***as the Marine Corps disagrees with the conclusions in this report, it will not release a copy of it to any outside agency.***" [70]

VOC contamination in well HP–651 and Tarawa Terrace

By then end of January 1985 it appeared that LantDiv and base officials had a handle on the VOC contamination found at Hadnot Point. They had closed 10 supply wells for the system and the water treatment plant appeared to be free of benzene and TCE. Two phone calls from residents in Paradise and Berkley manner set off a series of events which ultimately changed the course of the contamination story. The calls were concerning a gasoline smell in the drinking water provided by the Holcomb Boulevard WTP. The calls resulted in the discovery of a leaking generator fuel line at the treatment plant allowing gasoline to collect in the plant's reservoir. The plant was shut down and two connecting transfer valves were opened allowing Hadnot Point to supply water to the service area served by Holcomb Boulevard.[71] Prior to 1972, the Holcomb Blvd area was serviced by the Hadnot Point WTP and the intra-connection was preserved when the new plant began production. From January 27th through February 4th, Hadnot Point supplied all the treated water for Hadnot Point and the Holcomb Blvd systems. During this time, the Holcomb Blvd system was repeatedly flushed and cleaned. The state was brought in and split water samples were taken after the plant was cleaned.[72] However, unbeknownst to Navy and Marine Corps officials, one contaminated well had been missed in earlier testing for VOCs.

Well HP–651 was located along Piney Green Road and immediately adjacent to Lots 201 and 203, the base junkyard. Lots 201 and 203 was one of the 22 sites targeted for additional study but for some reason, well HP–651 was not selected to be sampled in July 1984.[73] The well site selected in 1971 by LantDiv engineers and installed in 1972. It is not known whether the engineers involved in selecting the site for well HP–651were knew of BUMED 6240.3c and the preventive measures built into the Navy's potable water regulations. It was their job to know and comply with these regulations. How could they possibly begin to justify the selection of a potable water supply well site less than 300 feet from the base junk yard and the base VOC disposal area (site 82).[74] This one well was the sole source for the horrific VOC readings found in the January 1985 samples taken from the Holcomb and Hadnot Point WTP service areas received in February of 1985.[75]

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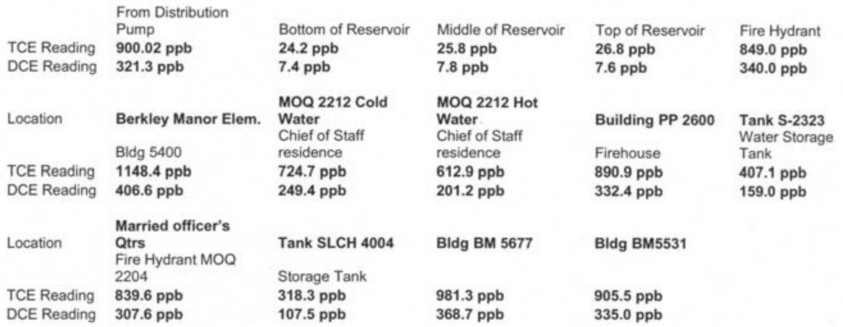
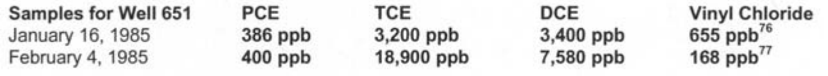
[66] Cercla, 523, December 1984.
[67] CLW 1105, January 1985.
[68] Cercla 388, Pdf pp 48–52, January 1985.
[69] Cercla 388, Pdf page 52, January 1985.
[70] CLW 4869, Pdf page 5, October 1985.
[71] CLW 4514, February 1985.
[72] CLW 4546, February 1985.



	From Distribution Pump	Bottom of Reservoir	Middle of Reservoir	Top of Reservoir	Fire Hydrant
TCE Reading	**900.02 ppb**	**24.2 ppb**	**25.8 ppb**	**26.8 ppb**	**849.0 ppb**
DCE Reading	**321.3 ppb**	**7.4 ppb**	**7.8 ppb**	**7.6 ppb**	**340.0 ppb**
Location	**Berkley Manor Elem.** Bldg 5400	**MOQ 2212 Cold Water** Chief of Staff residence	**MOQ 2212 Hot Water** Chief of Staff residence	**Building PP 2600** Firehouse	**Tank S-2323** Water Storage Tank
TCE Reading	**1148.4 ppb**	**724.7 ppb**	**612.9 ppb**	**890.9 ppb**	**407.1 ppb**
DCE Reading	**406.6 ppb**	**249.4 ppb**	**201.2 ppb**	**332.4 ppb**	**159.0 ppb**
Location	**Married officer's Qtrs** Fire Hydrant MOQ 2204	**Tank SLCH 4004** Storage Tank	**Bldg BM 5677**	**Bldg BM5531**	
TCE Reading	**839.6 ppb**	**318.3 ppb**	**981.3 ppb**	**905.5 ppb**	
DCE Reading	**307.6 ppb**	**107.5 ppb**	**368.7 ppb**	**335.0 ppb**	

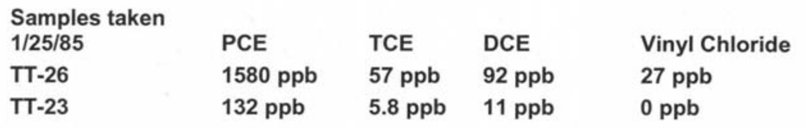
Well 651 was sampled and closed on 4 February 1985. The tests were completed on 8 February 1985. Both the January and February samples taken from well HP–651 were contaminated with extreme amounts of organic solvents.



Samples for Well 651	PCE	TCE	DCE	Vinyl Chloride
January 16, 1985	**386 ppb**	**3,200 ppb**	**3,400 ppb**	**655 ppb**[76]
February 4, 1985	**400 ppb**	**18,900 ppb**	**7,580 ppb**	**168 ppb**[77]

In their apparent attempt to demonstrate to the State of North Carolina their good stewardship of the environment, the Navy and Marine Corps inadvertently and independently documented the worst VOC contaminated supply well on the base and its corresponding affect on the finished water supplied to the residents of Camp Lejeune.

The Tarawa Terrace (TT) water distribution system test results for VOCs were received on the heels of the confirmation of contamination in well HP–651. Just as Mike Hargett and Bruce Babson had warned the base in 1982, The Tarawa Terrace well field was highly contaminated with VOCs, Specifically wells TT–26 and TT–23.[78]



Samples taken 1/25/85	PCE	TCE	DCE	Vinyl Chloride
TT-26	1580 ppb	57 ppb	92 ppb	27 ppb
TT-23	132 ppb	5.8 ppb	11 ppb	0 ppb

A subsequent test found the finished water provided to the families at Tarawa Terrace contained 215 ppb of PCE.[79] The contaminated wells were then immediately closed, almost three years after the initial warning from Mike Hargett and Grainger Laboratory.

The water supply problems at Tarawa Terrace presented the Navy and Marine Corps a different and more complex problem than with the Hadnot Point and Holcomb Blvd WTPs. Like the other treatment plants, the TT system served a large residential population with treated water. Unlike the other two systems on mainside, there was not intra-connection in the advent of an emergency. To further complicate the issue, the availability of raw water for the TT well fields was limited. Even before the closure of wells TT–26 and 23, TT was experiencing trouble with the availability of raw water for the treatment plant. A memo from W. R. Price, the Utility System Operator General Foreman, warned that the existing well field was unable to keep with the demands placed on the TT system and that continued over use of the wells in the system without periodic rest could lead to well failures.[80] With the closure of wells TT–26 and TT–23, Tarawa Terrace was expected to experience a 300,000 gallon per day shortfall of water for the residents of TT.

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[73] CLW 709, Pdf page 18, April 1983.
[74] Cercla 429, Pdf page 43, August 1991.
[75] CLW 2253, Pdf page 2, May 1993.
[76] CLW 5594, Pdf page 34, February 1985.
[77] CLW 5237, Pdf page 23, February 1985.
[78] CLW 5570, Pdf pp 18& 24, February 1985.
[79] CLW 5237, Pdf page 33, February 1985.

On 1 March 1985, a staff meeting for the Assistant Chief of Staff, Facilities was held on the base. The purpose of the meeting was to discuss water alternatives for Tarawa Terrace. A list of seven alternatives was developed by Colonel Lilley, Assistant Chief of Staff, Facilities.

1. Install a new well at Tarawa Terrace. The problem with a newer well was that water, in significant quantities was difficult to locate at Tarawa Terrace. Estimate cost: $80,000.
2. Transport water via tanker trucks from other water plants. However, the logistic of hauling 300,000 gallons per day was questionable. Estimated cost: $2,000 per day.
3. Tap into existing City of Jacksonville water line under Lejeune Blvd. There was a concern that the city may not be able to provide the water and there was a fear that the city would request reciprocating favors to the Marine Corps. Estimated cost: Unknown.
4. Change the existing contract for Holcomb Blvd to construct a water line to Tarawa Terrace immediately. The contractor was thought to be unable to perform this option in the time frame required. Estimate cost: Unknown.
5. Construction of a 8inch raw water line from Brewster Blvd to Tarawa Terrace across the railroad trestle on Northeast Creek. At the time, it was unknown if the state would approve the measure. Estimated Cost: $75,000.
6. Modify Tarawa Terrace plant to include aeration or granular activated carbon unit capable of removing VOCs. The alternative was rejected because of they felt the modifications could not be made in the time frame required. Estimated Cost: $300,000.
7. **Re-activate and use contaminated well(s) that have been closed if required to maintain adequate water levels and pressure**. Lack of Federal MCLs for VOCs or restrictions for using VOC contaminated *water is used to justify this measure*. However, the brief also reads "the potential health hazards must be weighed against the need and cost of providing water from other sources." (Please see entry for BUMED 6240.3B and 6240.3C and note the language concerning chemicals in the water: "*substances which may have a deleterious (harmful) physiological effect or for which the physiological effects are not known, shall not be introduced into the water system in a manner which would permit them to reach the consumer*." Estimated Cost: zero.

Alternative 5 was selected for implementation but the estimated completion date was 5 June 1985 and state approval for the project was needed. There was no discussion concerning how to provide for the impending water shortage during while the auxiliary line was under construction.[81] Two days prior to the meeting, a letter from the Calgon Activated Carbon Division in response to a LantDiv inquiry about emergency potable water treatment systems for VOCs arrived at LantDiv. Calgon advised LantDiv that based on the organic solvent and its corresponding concentration supplied by LantDiv, they could deliver as system capable of treating the potable water within 24–48 hours.[82] The Calgon system was never ordered According to Marine Corps documents, VOC contaminated well TT–23 was operated and supplied water to the residents of Tarawa Terrace on at least three different occasions until the temporary water line was completed in June of 1985.[83] The Tarawa Terrace WTP was finally closed on 1 March 1987. According to the water model completed by ATSDR in 2007, Tarawa Terrace remained contaminated with VOCs throughout this time period.

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[80] CLW 707, March 1983.
[81] CLW 1129, March 1985.
[82] CLW 6520, February 1985.
[83] CLW 1237, May 1985.

The USMC's Camp Lejeune contaminated drinking water media and public relations campaign.

At no point between the first warning of a problem with the base water supply discovered in October 1980 and the appearance of the first announcement informing the residents of the base that their drinking water was contaminated in December 1984, were any of the residents and the State of North Carolina informed about the contaminants found in the Hadnot Point and Tarawa Terrace drinking water systems. The first indication of a problem from the Marine Corps was an article announcing the commencement of the Confirmation Study. The article appeared in the base newspaper and was titled "*Environmental Study kicks-off*" Col. Lilley advised the residents of the base that"

> "***while contractors will routinely wear personal protective equipment such as chemical resistant overalls, we do not expect to expose anyone to any contaminants. The results of the survey are due in August 1984. If any contaminants are discovered, a review of alternatives will determine action necessary to meet health and environmental standards.***"[84]

What the Colonel failed to inform the residents was that they were already being exposed. The survey referenced in the article was the Confirmation Study.

The first announcement of drinking water contamination occurred in December 1984 when the base newspaper informed the residents of Camp Lejeune that:

> "***Environmental officials here are taking precautionary measures to ensure drinking water is free from possible contamination.***"
>
> "***As a result of water sampling taken on 3 December, four wells in the Hadnot Point industrial area were found to contain some traces of organic contamination.***"
>
> "***none of the compounds noted in the test samples are listed in the regulations under the Safe Drinking Water Act.***"
>
> "***Testing is being conducted as part of a basewide confirmation study which is currently underway to verify whether any groundwater contamination exists.***"
>
> "***Daily water samples are being taken from the water treatment plant to ensure drinking water remains within prescribed federal and state guidelines established by the Safe Drinking Water Act.***"
>
> "***Every effort will be made to maintain the excellent quality water supply traditionally provided to the residents of Camp Lejeune.***"[85]

On 30 April 1985, the Commanding General of Camp Lejeune issued a *Notice to Residents of Tarawa Terrace* informing them that two supply wells for TT were taken off line because "minute (trace) amounts of several organic chemicals have been detected in the water." The general then stated there were no definitive State of Federal regulations for the "compounds" and that as a "precaution" he ordered them closed. The remainder of the memo discussed the impending water shortages expected at Tarawa Terrace. At no point were the residents informed that well TT–23 had been used to supply water to them after its closure.[86] The next series of newspaper articles appeared in May 1985. The *Jacksonville Daily News* titled their article "*Chemical discovered in Lejeune water wells*." The article informed the reader that:

> "***Substances found in the wells were described today as volatile organic chemical by Gunnery Sgt John Simmons of Lejeune's Joint Public Affairs Office. He said he had no information on whether the well water was dangerous to humans.***"[87]

The *Wilmington Morning Star*'s article was contained more details and false assurances than the *Daily News*. The State head of the Water Supply Branch which regulates drinking water in North Carolina was quoted as stating"

> "***he did not think Camp Lejeune residents need to worry about getting bad drinking water. I think we kind of caught it right at the beginning***."

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[84] Cercla 132, Pdf page 6, June 1984

[85] Cercla, 523, December 1984.

[86] CLW 1191, April 1985.

[87] Cercla 132, Pdf page 7, May 1985.

> ***Another paper expanded this quote to include "It's not something that has been running for two or three years."***[88]

Base Spokesman Gunnery Sergeant John Simmons ended the article with what has become a standard Marine Corps anthem regarding the Camp Lejeune drinking water contamination and then wrapped it in a total fabrication.

> "***Simmons stated that while there were no state or federal regulations that mandate an unacceptable level of such contaminants in drinking water, "we ordered the closure of all wells that showed even a trace amount.***"[89]

These three articles and the general's notice to Tarawa Terrace constituted the first notifications that personnel and their families aboard Camp Lejeune received for an exposure that they could not touch, taste, see nor hear. They were relying on the Marine Corps to protect them and their families and for their trust they received and continue to receive betrayal.

As time passed between the discovery of the drinking water contamination and the news reports the Marine Corps' story began to change. An important point to remember is that Camp Lejeune, like many military bases, has a large mobile population. Some families spent years at the base while others rotated out over a period from months to years. By September of 1985, the Marine Corps' story became more direct as evidenced by a quote from the base Environmental Engineer, Robert Alexander, the same person who received Betz's memo in January 1983 concerning Grainger's tests performed on the Hadnot Point and Tarawa Terrace WTPs and the water provided to the system's consumers:

> "***Alexander said the 22 sites are not considered dangerous because only trace amounts of contamination have been found to have escaped from the dumps. He said that people had not been directly exposed to the pollutants.***"
>
> "***the last thing we want to find is that there is a large piece of Camp Lejeune that can't be used because of toxic waste disposal.***"
>
> "***Alexander said there is no clear relationship between the closing of the wells and any specific waste site.***"
>
> "***The way we got onto the well problem was in sampling near one of our fuel farms, or fuel storage facilities. We sampled nearby wells. In one near the fuel farm, we didn't detect fuel but did detect organic solvents.***"[90]

The same article also informed the reader that:

> "***Eight (wells) had been tainted by small amounts of fuel and solvents used to clean weapons and vehicles. Solvents found in two of the wells, in a residential neighborhood at the northern edge of the base, have been tentatively linked to civilian dry-cleaning firms in nearby Jacksonville***."
>
> "***No one has been harmed by the wastes***."
>
> "***Linton (EPA) said the most serious problem at Camp Lejeune was contamination of the groundwater with solvents that are suspected of causing cancer***."
>
> "***Col. Tiebout, Camp Lejeune's assistant chief of staff for facilities characterized all of the actions so far—closing wells, relocating the day care center, and extensive testing—as precautionary measures.***"[91]

In the public arena, fact was becoming fiction and the Marine Corps' spin on what transpired at the base between 1980 and 1984 was rapidly solidifying into reality. Behind the scenes, the EPA moved to force Camp Lejeune onto the National Priority List (NPL) also known as the Superfund list. In a meeting which took place at the base in November of 1985, Robert Alexander told the EPA that their contractor's report was in error and resisted the idea of placing the base on the NPL.[92] Somehow or another, the EPA walked away with the idea that no contamination was detected in treated potable water at the Hadnot Point WTP.[93] Two weeks after this meeting, the treated water at the Hadnot Point WTP was sampled and found to contain benzene in the extreme amount of 2,500 ppb.[94] The analytical data sheets for this test and a subsequent benzene finding several weeks later are both missing. There are no known notifications of this finding to the residents at Camp Lejeune and the words “Not Representative” were handwritten over the 14 November 1985 test results for the Hadnot Point WTP. The false contention that people were not directly exposed to the pollutants appeared again in a media story detailing the contamination written in January 1986.[95]

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[88] Cercla 132, Pdf page 11, May 1985.
[89] Cercla 132, Pdf page 7, May 1985.
[90] CLW 4855, September 1985.
[91] CLW 4855. September 1985.
[92] CLW 4903. November 1985.
[93] CLW 5430, February 1986.

On Christmas Eve 1987, the Jacksonville Daily News again repeated Robert Alexander’s September 1985 assertion that people had not been directly exposed to the pollutants. The paper also informed the public that the EPA was considering Camp Lejeune for the NPL. The contamination steadily devolved into “traces of TCE, DCE and PCE.” The fuel found at Hadnot Point had entirely disappeared in the media.[96]

Colonel Thomas Dalzell, Assistant Chief of Staff, Facilities was designated as the overall coordinator for Camp Lejeune’s incorporation onto the National Priorities List. In February 1988, he was featured in a question and answer press release which became the basis for several media news stories on the drinking water contamination aboard the base.

> “***Q. Is my health or the health of my family in any danger?***
>
> ***A. No it’s not. All the wells which we get our raw water out of are continually tested and the wells that were identified as being contaminated have been closed off.***”
>
> “***Q. What about prior to 1983?***
>
> ***A. At that time we were not aware of any of these particular compounds that might have been in the ground water and we have no information that anyone’s health was in any danger at that time.***”
>
> “***Q. What are the long term effects of exposure to these contaminants?***
>
> ***A. Heavy long term exposure to these chemicals could cause some health hazards, depending on the amount of chemical ingested.***”
>
> ***Q. What was the source of the contamination?***
>
> ***A. Most of the sources of contamination were the motor pools that existed down in the Hadnot Point area. At that time oil, greases, solvents, gasoline and cleaning fluids and other types of chemicals were just being dumped in the ground or dumped in sewers or things like that; and we were really not aware back in the 60’s and 70’s of the effects on groundwater contamination. Now we are more aware of these things and have taken appropriate precautions to ensure the ground water contamination is not progressing any further.***”[97]

How could the man placed in charge of coordinating the placement of Camp Lejeune on the NPL be ignorant of the fact that warnings about the contamination began in October of 1980? Was his claim that there was no knowledge of the drinking water contamination prior to 1983? Was this misrepresentation fabricated by design or ignorance?

The massive Hadnot Point Fuel Farm fuel spill surfaced again in late 1988. The attention was more than likely due to the impending release of O’Brien and Gere’s Final Report for the Contaminated Ground Water Study at Hadnot Point.[98] The engineer’s report detailed large losses of fuel from the HPFF and a fuel plume 15ft thick was identified floating in the semi confined aquifer at Hadnot Point. Once again, Marine Corps statements in the media did not match up what was actually known at the time. A *Jacksonville Daily News* article titled “*Base officials study cleanup of fuel leaks*” appeared in print in October.

> “***leaks from an underground tank system were confined to an are two square blocks around the fuel farm.***”
>
> “***The spill is contained by the section’s natural flat terrain and water table conditions.***”
>
> “***the number of gallons leaked is unknown.***”

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[94] CLW 1406, January 1986.
[95] Cercla 132, Pdf page 18, January 1986.
[96] Cercla 132, Pdf page 20, December 1987.
[97] Cercla 132, Pdf page 28, February 1988.
[98] Cercla 417, December 1988.

> “***Cleanup is expected to start after final design of glue/ recovery system. Recovered gasoline products are expected to be recycled for use on the base.***”[99]

By the following year, the base was ready for listing on the NPL and the old pattern of “no single source had been found for the chemicals (solvents) along with the 1983 IAS conclusion that none of the 22 sites selected for further investigation posed an immediate threat to human health were rehashed in the media.[100] Of the 22 sites, the Hadnot Point Fuel Farm was designated as the first site to be cleaned up once Lejeune was placed on the Superfund list.[101] Camp Lejeune was officially added to the NPL in October 1989. Shortly before the base was listed on the NPL an article appeared in the base newspaper featuring Base Supervisory Chemist, Elizabeth Betz who had laboriously documented the early stages of the contamination from May 1982 through January 1983.

> “***You’d have to look at each VOC individually, but many of them are carcinogens. That’s the main reason we immediately shut the wells down, although the levels we found in the tests were not near the EPA limit.***”
>
> “***We were puzzled when the chemicals showed up. At first, we couldn’t figure out how it had gotten into the Tarawa Terrace system. Then we looked across Highway 24. There were dry-cleaning businesses right across the road from the housing area.***”
>
> “***Once you have identified where the potential for a threat is, you start taking action to correct it. You can not leave a contaminant in the groundwater.***”[102]

The Marine Corps controlled the message and information surrounding the details of the drinking water contamination at Camp Lejeune. With the addition of Camp Lejeune onto the NPL, the Marine Corps was required to establish and administrative record for public use. This repository is located in the Onslow County Public Library. The problem is that a large number of personnel and families exposed at Camp Lejeune no longer live near the base to have access and view the CERCLA library. Beginning in the mid to late 2000’s, the Marine Corps placed portions of the administrative record on the internet. The online library is known as the “Baker website.” This website is cumbersome and largely unusable. A brief document library appeared on the USMC’s website but was removed after the Congressional hearing in 2007. Without access to original sources of information, the affected community is left to the mercy and whim of the Marine Corps. A breakthrough in gathering information occurred in 2007 with the release of ATSDR’s water model for Tarawa Terrace. The corresponding discs contained electronic files of the Marine Corps’ Camp Lejeune Water document library and the Cercla administrative record. Through these discs the affected community has had the opportunity to educate ourselves and revisit the Marine Corps’ version of what happened at Camp Lejeune.

Our advantage is the Corps told their lies up front. The truth is in their documents and they do tell a far different story than what the Marine Corps has asserted to the media and Congress. What is now needed is for an authoritative body such as Congress to work objectively with the Marine Corps and the affected community to ascertain what really happened at Camp Lejeune and what chemicals we were exposed to in our drinking water aboard the base. The stumbling block is that our government is the source and remedy for this issue and there is an inherent conflict of interest in securing the full and objective co-operation of the various agencies capable of providing the answer and ultimate relief from our exposures.

The recent Marine Corps informational brochure proudly boasts that the USMC has investigated three separate times and found to be exonerated of blame in the contamination.[103] Each of these prior investigations occurred before the release of the initial electronic document library to the public and our subsequent enlightenment of what transpired at Camp Lejeune during the contamination period. Both the Commandant’s 2004 Blue Ribbon panel and the Government Accountability Office (GAO) 2007 Report on Camp Lejeune share a common fatal flaw. Each report failed to identify the true extent of the fuel problem at Hadnot Point, the Navy and Marine Corps’ own internal directives and standards for potable water systems aboard Naval vessels and facilities, including Camp Lejeune and the Marine Corps’s 1974 Base Order identifying Organic Solvents as hazardous materials. Each report failed to locate and interview the owner and lead chemist from Grainger Laboratory concerning the events in 1982. Instead, the reports relied on LantDiv and base employees who, to one degree or another, seemed to suffer a collective form of selective memory. In fact, during the 2007 Congressional "Poisoned Patriot's" hearing, Chairman Bart Stupak asked the EPA's Special Agent, Tyler Amon if he had personally recommended that obstruction of justice charges be brought up against the former LantDiv and base personnel who appeared to have been coached and were uncooperative with his investigation. Agent Amon confirmed that he had identified areas of concern for obstruction of justice charges but these recommendations were overruled by the Department of Justice.[104] This same department is currently tasked with representing the government (the Navy and USMC) for any and all Federal Tort claims filed because of the Camp Lejeune drinking water contamination. This blatant lack of objectivity by the Department of the Navy continues to this day. Early this summer, the Secretary of the Navy established a Camp Lejeune Assistance Team (CLAT) in response to the pressure placed upon the Navy by Congress, the media and the affected community over the recent discoveries pertaining to the Hadnot Point Fuel Farm and the electronic portal. The CLAT is tasked to provide a report to Secretary Mabus. There is no input whatsoever from the affected community nor is there any shred of independent oversight or objectivity. Members of the CLAT are required not to do anything which may compromise the Navy's legal defense against the families. All in all, the CLAT, as with the prior government investigations into Camp Lejeune's contaminated drinking water, sounds like a classic case of the "Emperor's New Clothes"

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[99] Cercla 132, Pdf page 36, October 1988.

[100] Cercla 132, Pdf page 47, August 1989.

[101] Cercla 132, Pdf page 57, October 1989.

[102] CLW 1854, August 1989.

[103] USMC CL Booklet, Page 13, July 2010.

Perhaps one the most important single recent event in the Camp Lejeune contaminated drinking water story occurred last April when the ATSDR withdrew their flawed public health assessment (PHA) for Camp Lejeune. The assessment was fraught with errors including but not limited to, improper usage of exposure duration and dosage models used to characterize our risks for adverse health outcomes, the disappearance of the assessments supporting references and interviews, and the omission of benzene from the 1997 Camp Lejeune Public Health Assessment.[105] The Camp Lejeune PHA failed to recognize that our exposures on the base surpassed mere occupational settings. The models used to evaluate our exposures failed to account for the fact that the resident population on the base was exposed 24 hours a day and 7 days a week throughout the year. The PHA also underestimated the amount of contaminated water consumed by the personnel exposed on the base. To add insult to injury, the supporting interviews and documentation for the agency's work on the assessment were allegedly "accidently destroyed" by a contractor after the assessment was published. What this meant, was that there was no way for other scientists or the affected community to fact check ATSDR's work. The breaking point for ATSDR came when members of the Community Assistance Panel (CAP) for Camp Lejeune correctly identified that well HP–602 was discovered contaminated with fuel products while the well was actively pumping water for the Hadnot Point Water Treatment Plant. ATSDR's leadership found their prior position that no direct proof existed that benzene was in our water, suddenly untenable. On 28 April 2009, the ATSDR withdrew their Camp Lejeune PHA at our CAP meeting held in Atlanta. This event was the first time a PHA was withdrawn in the agencies history.

The ATSDR PHA for Camp Lejeune was not the only report which failed to address the benzene exposure at Camp Lejeune. In June of last year, the National Research Council (NRC) released their controversial report on Camp Lejeune.[106] This report was the result of well intended, but poorly overseen legislation, in which the Department of the Navy was allowed to write the charge, or directions to the scientist on how to conduct their review of scientific literature concerning the chemicals we were exposed to at Camp Lejeune. The committee focused their efforts on PCE and TCE and omitted benzene in their evaluations and assessments. I am not a scientist and thus not qualified to comment on the specifics of why the report is flawed. This area has been openly addressed by other scientists including one who participated in a peer review of the NRC report and who is present today as a witness before the committee. I will defer discussion of the scientific issues about the validity of the NRC to Dr. Richard Clapp of Boston University. However, there are some non scientific issues that have come to light concerning the report. First and foremost, shortly after the report was released to the public, we discovered that the National Academy of Science entered into a $600,000 contract with the Department of Defense to effectively serve as the DOD's hired gun and consultant for work at Camp Lejeune. What was more disturbing was that the contract was negotiated and signed while the NRC committee was engaged in their work on the Camp Lejeune NRC report.[107] Earlier this year, we learned that the National Academies quietly dissolved the contract with the DOD.

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[104] Official Transcripts for the "Poisoned Patriots: Contaminated Drinking Water at Camp Lejeune" hearing, Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, House of Representatives. Pdf page 144. June 2007.

[105] ATSDR Website, *http://www.atsdr.cdc.gov/hac/pha/pha.asp?docid=1082&pg=0*

[106] National Research Council, "Contaminated Water Supplies at Camp Lejeune: Assessing Potential Health Affects, June 2009.

Shortly after the NRC report was released, the Marine Corps mailed a letter signed by Major General Payne to every registrant with the Marine Corps for Camp Lejeune. The letter notified the registrants that ATSDR withdrew their PHA for Camp Lejeune because of the omission of benzene contamination but was written in such a way as to infer the NRC committee did review and assess the benzene exposures at Camp Lejeune.[108] What is puzzling is that much of what we now know about the benzene contamination was not provided to the NRC reviewers. Like ATSDR, there are no supporting documents indicating that the NRC Committee members knew of the existence of up to 1.1 million gallons of fuel lost into the groundwater at Camp Lejeune.[109] It is a mystery how the Marine Corps and Major General Payne are able to conclude that the NRC did indeed evaluate and assess our benzene exposures in the drinking water at Camp Lejeune.

Just how did the Hadnot Point Fuel Farm's massive fuel loss escape the attention of ATSDR in their 1997 PHA? We may never know the complete answer to that question but what the historical documents make clear is that ATSDR should have known about our benzene exposures, investigated them and assessed the risk of those exposures. The Navy and Marine Corps were also complicit in casting a shroud over the fuel losses at the Hadnot Point Fuel Farm. It was their base, their facility where the contamination occurred, their documents detailed the extent of the contamination and their people were the ones exposed. The Navy and Marine Corps had a moral obligation to ensure the State and Federal regulatory agencies, especially the ATSDR knew we were exposed to benzene. If the subcontractor for the ATSDR had not found the UST portal in 2009, just when did the Navy and Marine Corps plan to disclose the fuel losses at Hadnot Point? Was this a game of catch me if you can?

The defunct ATSDR PHA did contain a reference to a Marine Corps sponsored report on the Hadnot Point Industrial Area issued in May of 1988. Contained on page 18 of 373 is a statement by the contractor in which benzene was described as a contaminant in well 602. The lost fuel was also found in the deep aquifer at Hadnot Point.[110] There was no excuse for the personnel working for ATSDR at that time to have missed this vital fact which confirmed benzene was a major contaminant at Camp Lejeune. However, with this being said, once it was established that the ATSDR was in error, the 1997 PHA for Camp Lejeune was rescinded. The same was not true for the polluter. Instead of acknowledging their role in the omission of benzene in the PHA by ATSDR, the Navy and Marine Corps leveled sole blame at the ATSDR:

> "***If benzene was not fully addressed in the PHA, it was not for lack of data***." [111]

According to Col Tokarz's March 1988 letter concerning the Hadnot Point Fuel farm, the upcoming Technical Review Committee (TRC) was slated to discuss the details about the HPFF and fully explain the situation to the members of the committee which included the community and representatives of the EPA.[112] Four months later, the first TRC meeting took place aboard Camp Lejeune. The TRC was a requirement of CERCLA and served to bring the affected community, DOD and EPA together to discuss developments for cleaning up the base. When the time came to discuss the Hadnot Point Fuel Farm, as promised in Tokarz's letter, something entirely different happened:

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[107] Chairman Subcommittee on Investigation and Oversight, Committee on Science and Technology Brad Miller Letter to Dr. Ralph Cicerone, President National Academy of Sciences, November 2009. With attachments.

[108] USMC letter to Camp Lejeune Registrants, General Payne USMC, June 2009.

[109] Excerpt from Document #1185. This document was found by ATSDR within the recently discovered limited access web portal for the Navy's Underground Storage Tank Program, NavFacEngCom.

[110] Cercla 258, May 1988.

[111] USMC Response to Senator Burr and Hagan Queries on Camp Lejeune, Pdf page 10 July 2009.

[112] Cercla 96, Pdf Page 33–34, March 1988.

> ***Cheryl Barnett, LantDiv: "Well, they're part of the other 22 sites that we said we are looking at, we just don't have any data to present to you today."*** [113]

Earlier in the meeting, the base environmental engineer was asked what kind of readings were found in the water samples from the 1980's. Mr. Alexander who was present during that time period and fulfilled the role of base environmental engineer stated:

> "***We had very little, if any data, before we realized our groundwater was contaminated.***" [114]

Why the deception? In December 1988, the O'Brien and Gere Contaminated Ground Water Study for Camp Lejeune was released. The report identified two pools of free floating gasoline in the groundwater at Hadnot Point. The engineers were unable to clearly define the exact boundaries and extent of the plumes. Clearly, the fuel contamination was much worse than the 23,150 to 33,150 gallons cited in base inventory records.[115]

Sometime between 1985 and 1990, the Navy moved handling of the HPFF fuel loss problem to LantDiv's Underground Storage Tank Program. We have been unable to ascertain the exact date and how this was accomplished. The Navy stated in their 2009 written responses to Senator Burr and Hagan that:

> "***After 1986, the sites were evaluated to determine whether they were under the CERCLA, in which the EPA or RCRA, in which the state has primacy. In 1988 it was determined that corrective action at the HPFF fell under RCRA and therefore the State of North Carolina had primacy.***" [116]

Apparently, the Navy and Marine Corps forgot to inform the EPA of their evaluation. There was another problem with their arbitrary determination. The CERCLA vs. RCRA delineations did not apply if mixed contaminants were present. If mixed contaminants were present at a Superfund site, CERCLA is primary. The issue came to a head at a TRC meeting in July of 1990. During the meeting, Camp Lejeune officials informed the EPA representative that HPFF was not part of the Federal Facilities Agreement and thus out of the purview of the EPA. Base officials advised the EPA that a fuel recovery system for the HPFF was finalized and ready for bidding. Once bidding was completed, the Navy and Marine Corps were ready to begin remediation of the shallow aquifer around the HPFF. The EPA representative, Victor Weeks, disagreed and advised the attendees of the meeting there was a mixing of solvent plumes and fuel plumes and as such, the groundwater cleanup in the HPIA is all interconnected.

"***Just because it's an underground storage tank at this point doesn't matter to us because we have a combined plume.***" Mr. Weeks went on to conclude: "***If this was an isolated area separated from Hadnot Point, we could agree with that (Handling under the state's UST program) we feel like it's part of the CERCLA program as well***". He also warned that the Navy was doing work at their own risk.[117]

By April of 1992, Mr. Weeks was no longer the EPA representative working on Camp Lejeune. The EPA replacement received a letter from Paul Rakowski at LantDiv requesting that the HPFF be exempt from CERCLA under the petroleum exclusion because Jet Fuel was the only source of contamination at the HPFF.[118] Shortly afterwards the HPFF was officially moved to the RCRA program and under the purview of the State of North Carolina. The result of this move was the HPFF was dropped from CERCLA and corresponding reports pertaining to CERCLA sites on the base. For example, the 1994 Final Remedial Investigation Report for Operable Unit 1 (Sites 21, 24 and 78 in the Hadnot Point Industrial Area) mentions the existence of the HPFF within the Operable Unit, but then the report added that:

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[113] Cercla 496, Pdf page 74, August 1988.

[114] Cercla 496, Pdf page 54, August 1988.

[115] Cercla 417, Pdf page 8 &24, December 1988.

[116] USMC Response to Senator Burr and Hagan Queries on Camp Lejeune, Pdf page 12, July 2009.

[117] Cerlca 493, Pdf pp 4–11, July 1990.

[118] Cercla 724, April 1992.

> "***Since the fuel farm area is a UST problem, it is not included as part of the CERCLA RI/FS process, but is being handled as a separate study under the UST Program.***" [119]

Another result of the move from RCRA to CERCLA was that documents pertaining to the UST Program were not required to be filed for public view in the CERCLA Administrative Record. This is evident when one compares the CERCLA administrative records file to what was filed with the State of North Carolina. The end result was that control of information concerning the Hadnot Point Fuel Farm lay at the discretion of the Navy and what reports they chose to submit to the State of North Carolina. The EPA was effectively out of the HPFF picture.

A July 1994 court recorded public hearing was held at Camp Lejeune concerning the proposed clean up for the Hadnot Point Industrial area, except the HPFF. A base representative was asked why there was no public hearing for the HPFF. Neal Paul, The base Installation Restoration Program Manager for Camp Lejeune responded:

> "***There are some public relations requirements and this predates me.***"

Mr. Paul failed to answer the question and advised the attendees of the meeting:

> "***to date there's like 25,000 gallons of gasoline from the inventory records that were shown to be missing. And to date we have recovered about 20,000 gallons of gasoline.***"
>
> "***but the plume treatment is pretty close to being remediated.***"
>
> "***If you get 75% of the free product that you think you spilled into the groundwater, then you're doing a great job, and 20 out of 25 is almost 80 percent. So, we done probably as good as we can do.***"
>
> "***And that is really one of our big success stories.***"
>
> "***From the people I've talk to in the state agree it is a success.***" [120]

Two years later a partnering meeting hosted by Mr. Paul was held at Camp Lejeune. The attendees included base officials, the Navy's contractor for the remediation work on the base, representatives from the State of North Carolina, EPA and personnel from LantDiv. The meeting was not open to the public. A contractor for the Navy advised the attendees that based on data from an engineering contractor working on the HPFF, an estimated 800,000 gallons of fuel had been lost at the HPFF and benzene was appearing in the deep aquifer.[121] Notably absent from the meeting were representatives from the ATSDR. The ATSDR 1997 PHA for Camp Lejeune was still in draft form at the time of the meeting. The brief reference to the 800,000 gallon fuel loss was the only place we have found in the entire CERCLA library which quantified the size and scope of the fuel plumes at Hadnot Point and is more than the disclosed 23,150 to 33,150 gallons lost in Marine Corps inventory records.

The former base Fleet Service and Refueling area was located within 300 feet and up-gradient from well HP–602. Buildings 1100, 1111, 1115 and seven underground storage tanks comprised the facility. The USTs were intra-connected to the fuel farm by underground piping.[122] The facility served as a service station from 1957–1965, and administrative office from 1965–1972, a data processing center 1972–1976 and a printing plant from 1976–1986.[123] The tanks were removed from the ground in 1993 and the contents of the tanks were described as diesel fuel and gasoline.[124] Building 1115 turned out to be a separate and distinct source of fuel loss at the Hadnot Point Industrial Area. Last week the Navy released many of the documents on the web portal discovered by ATSDR last year to the public. We are currently reviewing this previously undisclosed document library and we are finding indications organic solvents were mixed in the fuel plume at this site. As far as we know, no specific risk assessment or remedial investigation was ever performed for building 1115. Instead, the Navy sent a letter to the State of North Carolina advising the State that building 1115 was being incorporated into the Hadnot Point Fuel Farm and the two were handled as one site.[125] Who gave the Navy the authority to make this decision and why was it not challenged by the EPA? Building 1115 was only mentioned in the CLW and CERLCA libraries. The extent of the contamination found in the groundwater underneath the former Fleet Service and Refueling Area was not previously disclosed to ATSDR. Details of the contaminants found at building 1115 are currently surfacing as we review the documents. The concealment of building 1115 did not stop with ATSDR. In 1991 the EPA queried the Navy whether USTs existed at building 1100/1115.[126] Paul Rakoswki from LantDiv responded that a leaking 55 gallon drum of PCE was found at the site but failed to answer the EPA's question on the USTs.[127] If one agency of our government chooses to misrepresent and conceal material facts to Federal regulators in another agency and nothing happens when the truth is revealed, where is the accountability?

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[119] Cercla 1161, Pdf page 78, June 1994.
[120] Cercla 366, Pdf pp 91–94, July 1994.
[121] Cercla, 1866, Pdf page 4, November 1996.
[122] Cercla 2358, Pdf page 289, January 1989.
[123] Cercla 651, October 1986.
[124] CLW 1917, March 1993.
[125] North Carolina UST Document Library, April 1994.

It is now thirteen years since the release of the 1997 Public Health Assessment for Camp Lejeune and the community still has no clear answer to what happened to us while we or our loved ones served our country. Our country has seen a renewed appreciation for our volunteer military and the sacrifices made by our fighting men, women and their families. It is hard to drive down the road without seeing a "support the troops" ribbon on someone's car. How can we profess respect for our military personnel and families when in their time of need, this country not only abandoned them but abandoned their families as well. We trusted the Marine Corps would do the right thing for their Marines and their families. We trusted that the EPA and the State of North Carolina would ensure the Marine Corps fully disclosed the extent of the contamination at Camp Lejeune. The subtitle of this hearing is "Looking back, Moving Forward." We looked back and found the Marine Corps' statements do not match the historical documents. We can not move forward with understanding the Camp Lejeune drinking water contamination unless there is a full disclosure from the Navy and Marine Corps. We can not rely on the agencies of the Executive branch to provide our answers. The Department of Defense was the polluter. The Department of Justice represents the government for all claims brought against the Navy and Marine Corps and overruled the EPA special agent investigating government wrong doing at Camp Lejeune. Congress is where this issue must be resolved. What other measures has the DoJ taken to bolster their defense for the government? Our exposures are known and well documented. The negligence of the Marine Corps is clear. There are thousands of Marines, Sailors, their family members and base employees who were sickened by he fouled water at Camp Lejeune. When will this country fulfill our commitment to support the troops?

BIOGRAPHY FOR MICHAEL PARTAIN

Michael Partain is the dependent son of Captain Warren Partain and was born at Camp Lejeune in 1968 during the drinking water contamination. His parents lived aboard the base at Tarawa Terrace. The Partain family settled in Florida in 1972 after leaving the Marine Corps. Three years ago Michael was diagnosed with male breast cancer at the age of 39. Since then he has located 63 other men from Camp Lejeune with the disease. Michael became involved with the Camp Lejeune after viewing a television report about Camp Lejeune while he was treating his breast cancer. Since then he has become a community advocate and a community representative of the ATSDR Community Assistance Panel (CAP) for Camp Lejeune.

Chairman MILLER. Thank you, Mr. Partain.

We probably are going to be interrupted by votes, so we do need to try to keep some kind of schedule, and I appreciate your testimony. It is an important contribution to today's hearing.

Mr. Watters, you are recognized for five minutes.

STATEMENT OF JAMES WATTERS, DIRECTOR, GRADUATE MEDICAL EDUCATION, TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER, FORMER NAVY LIEUTENANT, RETIRED COMMANDER, NAVY RESERVE, MEDICAL SERVICE CORPS AND CAMP LEJEUNE VETERAN DIAGNOSED WITH KIDNEY CANCER

Mr. WATTERS. Mr. Chairman, Ranking Member Broun, members of the Committee, thank you for taking the time to address this important issue and permitting me the honor of appearing before you to tell my story. I believe it is similar to the stories of thousands of others who were at Camp Lejeune.

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[126] Cercla 71, Pdf page 5, October 1991.

[127] Cercla 27, December 1991.

I am a retired Navy Medical Service Corps Commander who served at Naval Regional Medical Center, Marine Corps Base Camp Lejeune from June 1977 until November 1979. Prior to my naval service, I served in the U.S. Army Infantry in Vietnam from November 1969 until I was wounded in combat while walking point for my infantry company on September 6, 1970. When I was wounded, my commanding officer, Captain Allen G. Vitters, ran and crawled through enemy fire to drag me to safety. This is what a leader does.

In November 2007, I was diagnosed with advanced renal cell carcinoma, stage 3, almost stage 4. I had a kidney removed in December 2007, and in January 2008 was told by my oncologist I had about a year to live. In approximately July 2008, I received an envelope from the IRS which contained a letter from General Payne advising me I had been exposed to trichlorethylene and other hazardous chemicals while serving at Camp Lejeune. It is important to note this letter came 21 years after the Marine Corps and the Department of the Navy knew in 1987 that I and many others had been exposed to volatile organic compounds.

I researched the possible link between TCE and RCC, renal cell carcinoma, and found a probability of the link between TCE and RCC. I then filed a claim with the Department of Veterans Affairs in order to obtain benefits for my family for after my death. The VA, of course, denied the claim. I resubmitted my VA claim including additional information about the link between TCE and renal cell carcinoma. The claim was again denied in March of 2009. I then consulted three science faculty, two of whom are toxicologists who work at the medical school where I work as an Assistant Dean for Graduate Medical Education. They wrote strong letters of support for my claim, and I requested a hearing with a decision review officer at the VA regional office in Waco, Texas. I was granted the opportunity to appear before the decision review officer in July—I am sorry—in June of 2009 to present my case. The evidence I presented met the VA criteria “as likely as not” so the claim was decided in my favor and I was granted 100 percent service-connected disability for the renal cell carcinoma as a result of my exposure to TCE at Camp Lejeune. Receiving this disability rating made my wife and my adult disabled son eligible for CHAMP VA insurance coverage for the rest of their lives, and CHAMP VA is similar to TRICARE.

I would have appreciated being notified by the Marine Corps even 18 months before the July 2008 notice. It would have made a difference in when my kidney cancer was diagnosed and my prognosis.

As I researched the Camp Lejeune situation, I was horrified to find out how many people the Marine Corps had poisoned and the obstructionist tactics the U.S. Marine Corps and Department of the Navy has used to avoid responsibility and avoid providing any type of assistance with health care or any financial assistance to those they have sickened and to the families of those whose deaths they have caused. Examples of obstructionist tactics include the Marine Corps’s failure to cooperate with the State of North Carolina’s efforts to analyze and address this problem in the 1980s, The 21 years it took for the Marine Corps to notify those they poisoned, the intense pressure it took to have the Marine Corps fund the ATSDR study, the failure of the Marine Corps to turn over critical documents until forced to do so, and numerous other examples of the Marine Corps and Department of the Navy strategy to deny and delay as long as possible.

I firmly believe this strategy is based upon financial considerations and I do not know what role the Department of Defense has in this strategy. It is possible that the Marine Corps and Department of the Navy senior leaders are “just following orders.”

It is my firm belief that the United States Marine Corps and Department of the Navy leadership have abandoned and betrayed their wounded from Camp Lejeune including women and children and left them to suffer and die. I am very sensitive to caring for the wounded because in the Army we were trained to never leave our wounded behind. I saw men wounded and killed in Vietnam trying to recover our wounded. The U.S. Soldier’s Creed specifically states, “I will never leave a fallen comrade.” If the Marines have a similar creed, their senior leaders seem to think it does not apply in this case.

Suggestions for immediate action: Because it is crystal clear there is a leadership vacuum at the United States Marine Corps and Department of the Navy on this issue, I suggest Congress step in immediately to pass legislation to provide health care to those who have been sickened by the Camp Lejeune poisonings. Everyone in this room knows this is morally and ethically the right thing to do. The United States Marine Corps and Navy have proven they will not and cannot be trusted to do the right thing. Time is of the essence, so political party differences should not be permitted to delay taking effective action.

Number two: The Department of Veterans Affairs should immediately consider how they can streamline the disability claims process for those who have been sickened by the Camp Lejeune poisons. The only reason I was able to win my claim was because of the resources at my disposal in the school of medicine where I work. Very few veterans have such resources available to them. Eventually the VA will develop a list of presumptive illnesses for those exposed at Camp Lejeune. It should not take 10 or 15 years as it did for Agent Orange. People are sick and they and their families need help now. Also, the VA should publicize this matter in their outpatient clinics and hospitals to alert those who were poisoned. I have tried for over one year to have my local VA hospital in Amarillo, Texas post notices of the Camp Lejeune situation to alert veterans who may have been exposed. When I told them that I was coming to this hearing, they decided to finally post the notices.

Lastly, as you hear from the United States Marine Corps and the Department of the Navy about all they have done to address this matter, I would urge you to consider the evidence of the steps the U.S. Marine Corps and the Department of the Navy have taken to obstruct resolution of this very serious environmental disaster. This is basically a “friendly fire” incident in slow motion and every possible measure has been taken by the Marine Corps and the Department of the Navy to deny and delay providing any assistance whatsoever to their victims. The Marines claim to have spent $22 million to address this but I would point out that this amount over 20 to 25 years is a pittance and I would ask you to consider what amount of this total was the Marine Corps compelled to spend and how much was spent on obstructing any efforts to provide any assistance whatsoever to Marine Corps victims.

Finally, the U.S. government has a very poor track record of assisting in a timely manner those who have been harmed by the Department of Defense. Examples include the atomic vets, the Agent Orange vets, the Gulf War syndrome vets, and now this. Congress has the opportunity to deal with this in a timely and effective manner and to do the right thing. I urge Members of Congress to do what you know should be done. Thank you.

[The prepared statement of Mr. Watters follows:]

PREPARED STATEMENT OF JAMES L. WATTERS

I start today by thanking the Members of this Congressional Committee for taking the time to address this important issue and permitting me the honor of appearing before you to tell my story.

My name is James Watters and I am a retired U.S. Navy Medical Service Corps Commander who served at the Naval Regional Medical Center, Marine Corps Base Camp Lejeune from June, 1977 until November, 1979. Prior to my Naval service I served in the U.S. Army infantry in Vietnam from November, 1969 until I was wounded in combat while walking point for my infantry company on September 6, 1970. When I was wounded, my commanding officer, Captain Allen G. Vitters ran and crawled through enemy fire to drag me to safety. That is what a leader does.

In November, 2007 I was diagnosed with advanced (stage 3, almost stage 4) renal cell carcinoma (RCC). I had a kidney removed in December, 2007 and in January, 2008 was told by my oncologist I had about a year to live.

My initial thought about the cause of the cancer was my exposure to agent orange because there is no history of renal cell carcinoma in my family. My research showed no link between agent orange and RCC.

In approximately July, 2008 I received an envelope from the IRS which contained a letter from a Marine Corps General advising me I had been exposed to trichloroethylene (TCE) and other hazardous chemicals while serving at Camp Lejeune. It is important to note that this letter came 21 years after the USMC and the Department of the Navy knew, in 1987, that I and many others had been exposed to volatile organic compounds. (VOCs) I researched the possible link between TCE and RCC and found a probability of the link between TCE and RCC. I then filed a claim with the Department of Veterans Affairs (VA) in order to obtain benefits for my family for after my death.

The VA of course denied my claim. I resubmitted my VA claim including additional information about the link between TCE and RCC. The claim was again denied in March of 2009. I then consulted three science faculty, two of whom are toxicologists who work at the medical school where I work as an Assistant Dean for Graduate Medical Education. They wrote strong letters of support for my VA claim and I requested a hearing with a Decision Review Officer (DRO) at the VA Regional Office in Waco, Texas.

I was granted the opportunity to appear before the DRO in June, 2009 to present my case. The evidence I presented met the VA criterion "as likely as not" so the claim was decided in my favor and I was granted 100% service connected disability for the RCC as a result of my exposure to TCE at Camp Lejeune. Receiving this disability rating made my wife and my adult disabled son eligible for CHAMPVA insurance coverage for the rest of their lives. (CHAMPVA is very similar to TRICARE.)

I would have appreciated being notified by the USMC even 18 months before the July, 2008 notice. It would have made a difference in when my RCC was diagnosed and my prognosis.

As I researched the Camp Lejeune situation I was horrified to find out how many people the USMC had poisoned and the obstructionist tactics the USMC and the Department of the Navy have used to avoid responsibility and avoid providing any type of assistance with health care or any financial assistance to those they have sickened, and to the families of those whose deaths they have caused. Examples of obstructionist tactics include the USMC's failure to cooperate with the State of

North Carolina's efforts to analyze and address the problem in the 80s, the 21 years it took for the USMC to notify those they poisoned, the intense pressure it took to have the USMC fund the ATSDR study, the failure of the USMC to turn over critical documents until forced to do so and numerous other examples that the USMC's and Department of the Navy's strategy is to deny and delay as long as possible. I firmly believe this strategy is based upon financial considerations and I do not know what role the Department of Defense has in this strategy. It is possible the USMC and Department of the Navy senior leaders are "just following orders."

> **It is my firm belief that the USMC and Department of the Navy leadership have abandoned and betrayed their wounded from Camp Lejeune, including women and children, and left them to suffer and die!**

I am very sensitive to caring for the wounded because in the U. S. Army we were trained to never leave our wounded behind. I saw men wounded and killed in Vietnam trying to recover our wounded. The U.S. Soldier's Creed specifically states "I will never leave a fallen comrade." If the Marines have a similar creed their senior leaders seem to think it does not apply in this case.

Suggestions for immediate action:

1. Because it is crystal clear there is a leadership vacuum at the USMC and the Department of the Navy on this issue I suggest Congress step in immediately to pass legislation to provide health care to those who have been sickened by the Camp Lejeune poisonings. Everyone in this room knows this is morally and ethically the right thing to do. The USMC and the Navy have proven they will not and cannot be trusted to do the right thing. Time is of the essence so political party differences should not be permitted to delay taking effective action.
2. The Department of Veterans Affairs should immediately consider how they can streamline the disability claims process for those who have been sickened by the Camp Lejeune poisons. The only reason I was able to "win" my claim was because of the resources at my disposal in the school of medicine where I work Very few veterans have such resources available to them.

Eventually the VA will develop a list of presumptive illnesses for those exposed at Camp Lejeune. It should not take 10 or 15 years as it did for agent orange. People are sick and they and their families need help now.

Also, the VA should publicize this matter in their outpatient clinics and hospitals to alert those who were poisoned. I have tried for over one year to have my local VA Hospital in Amarillo, Texas post notices of the Camp Lejeune situation to alert veterans who may have been exposed. Thus far they have refused to post any notices including VA information regarding this matter.

Lastly, as you hear from the USMC and the Department of the Navy about all they have done to address this matter I would urge you to consider the evidence of the steps the USMC and the Department of the Navy have taken to obstruct resolution of this very serious environmental disaster. This is basically a "friendly fire" incident in slow motion and every possible measure has been taken by the USMC and the Department of the Navy to deny and delay providing any assistance whatsoever to their victims. The Marines claim to have spent $22,000,000 to address this but I would point out that this amount over 20–25 years is a pittance and I would ask you to consider what amount of this total was the USMC compelled to spend and how much was spent on obstructing any efforts to provide any assistance whatsoever to the USMC's victims.

Thank you for listening.

BIOGRAPHY FOR JAMES L. WATTERS

Date of birth: April 20, 1950

Current residence: Lubbock, Texas

Current position: Assistant Dean for Graduate Medical Education
Texas Tech University Health Sciences Center School of Medicine

Education: B.S. Business Management—Roger Williams University
Masters of Hospital Administration—VA. Commonwealth University

Military Service: U.S. Army 1969–1972 (Vietnam 1969–1970)
U.S. Navy active duty 1975–1981 (Camp Lejeune 1977–1979)
U.S. Naval Reserve 1981–2000

Positions held: Hospital Administrator, Public Health Administrator, Consultant

Chairman MILLER. Thank you, Mr. Watters.

Mr. Devereux, you are next. I assume with a name like Devereux, you may very well say Lejeune. If that is your preference, you may go right ahead. You are recognized for five minutes.

STATEMENT OF PETER DEVEREUX, FORMER MARINE CORPS CORPORAL AND CAMP LEJEUNE VETERAN DIAGNOSED WITH BREAST CANCER

Mr. DEVEREUX. Mr. Chairman and guests, good morning. My name is Peter Devereux. I was in the Marines from September 1980 until December 1984. I was stationed at Camp Lejeune from December of 1980 until April of 1982. I was assigned to the 8th Communication Battalion in the French Creek area of Hadnot Point.

I was diagnosed with invasive ductal carcinoma, a very aggressive form of breast cancer, on January 8, 2008. I had mastectomy surgery which removed my left breast along with 22 cancerous lymph nodes on January 28, 2008. The following month I began a treatment regimen which consisted of 29 chemotherapy treatments, 30 radiation treatments along with daily medication.

My treatment was scheduled to end April 8, 2009. At that point it was discovered my cancer had spread to my spine, my ribs and my hips. It is now classified metastatic breast cancer. There is no cure. The average life expectancy after metastasis is two to three years. Since my diagnosis, I have had 18 more chemotherapy treatments for a total of 47, 15 more radiation treatments to my spine and eight more to my hip for a total of 53 treatments. I will be in treatment until I die. I will be in treatment until I die. Presently I receive chemotherapy every three weeks and take prescription medicine daily.

I am constantly fatigued both mentally and physically and need to take multiple rests daily. My body has changed tremendously and is always sore. Prior to my diagnosis I was in perfect health, always active between work and working out. I ate well, never smoked and hardly ever drank. I always had tremendous energy. Of course that is no longer true.

I have a great wife and we have a 12-year-old daughter. This disease has not only ravaged me, it has ravaged my entire family. It has impacted my daughter severely. She is not confident of her future with me and I am not confident of my future with her. I have no idea if I will see my daughter graduate high school, go to college or get married.

Before my diagnosis I had been a very productive person. I feel like such a burden to everyone especially my wife and daughter. I am no longer able to work due to the devastating side effects and physical limitations from my treatments and surgeries.

The water contamination at Camp Lejeune has wreaked havoc on my family and me. On August 1, 2008, I received a letter from the Department of the Navy stating unregulated chemicals were discovered in some of the base drinking water systems in the early 1980s at Camp Lejeune. The Hadnot Point water distribution system was one of those.

I had decided to move forward with genetic testing for the breast cancer gene at that point, which I tested negative for both of them. It was then that I really discovered and understood that my cancer came from my chemical exposure due to the chemicals in the drinking water at Camp Lejeune.

The wells were discovered to be contaminated in 1980 when I arrived. The Marines knew about it and said nothing, knowing full well we were bathing in and drinking contaminated water on a daily basis. The water reports all state that the wells were contaminated and action needed to be taken and nothing was done.

In March of 1982 a switch to Grainger Analytical Laboratories once again showed contamination and still nothing was done. I would also like to point out in 1974 the base commander declared organic solvents as a hazardous substance and then warned the commands at Camp Lejeune that improper disposal would result in the contamination of the drinking water.

After receiving my letter in August in 2008, I filled out the United States Marine Corps Water Registry as requested. It was then that Mike Partain contacted me and let me know that I was the seventh man that was diagnosed with male breast cancer from Lejeune, and that was in August of 2008. There are now currently 64 men with male breast cancer from Camp Lejeune.

I originally filed a claim for VA benefits on November 11, 2008, to be denied in April of 2009. I appealed the claim and requested a hearing, which I received in May 2010 in Boston, Massachusetts. I had one hour to present my information about my case—the doctor's letters, letters from Dr. Clapp and Senator Kerry of Massachusetts.

My case was approved with 100 percent disability in August of 2010. This will greatly help my wife, my daughter and myself, and I hope the VA will continue to help veterans and civilians affected by the contamination.

Thank you for allowing me to speak.

[The prepared statement of Mr. Devereux follows:]

PREPARED STATEMENT OF PETER DEVEREAUX

Good morning, my name is Peter Devereaux I was in the Marines from Sep 1980–Dec 1984 and was stationed at Camp Lejeune from Dec 1980–April 1982. I was assigned to the 8th Communication Battalion in the French Creek area of Hadnot Point.

I was diagnosed with invasive ductal carcinoma, a very aggressive form of breast cancer on Jan 8th 2008. I had mastectomy surgery that involved removal of my left breast along with 22 cancerous lymph nodes on Jan 28th 2008.

The following month I began a 14-month treatment regimen which consisted of 29 chemotherapy and 30 radiation treatments along with daily medication.

My treatment was scheduled to end April 8th 2009 when it was discovered my cancer had spread to my spine, ribs and hip. It is now classified metastatic breast cancer, THERE IS NO CURE! The average life expectancy after Metastasis is 2–3 years. Since my metastatic diagnosis I have had 18 more chemotherapy treatments for a total of 47, and also 15 more radiation treatments to my spine and 8 more to my hip for a total of 53.

I will be in treatment until I die. Presently I receive chemotherapy every 3 weeks and take prescription medication daily.

I am constantly fatigued both mentally and physically and need to take multiple rests daily; my body has changed completely and is always sore. Prior to my diagnosis I was in perfect health; always active between work and working out, I ate well, never smoked and hardly drank. I always had tremendous energy; of course that is no longer true.

I have a great wife and we have a 12-year-old daughter. This disease has not only ravaged me it has also ravaged my entire family. It has impacted my daughter severely. She is not confident of her future with me nor am I of my own future with her. I have no idea if I will see my daughter graduate high school, go to college or get married.

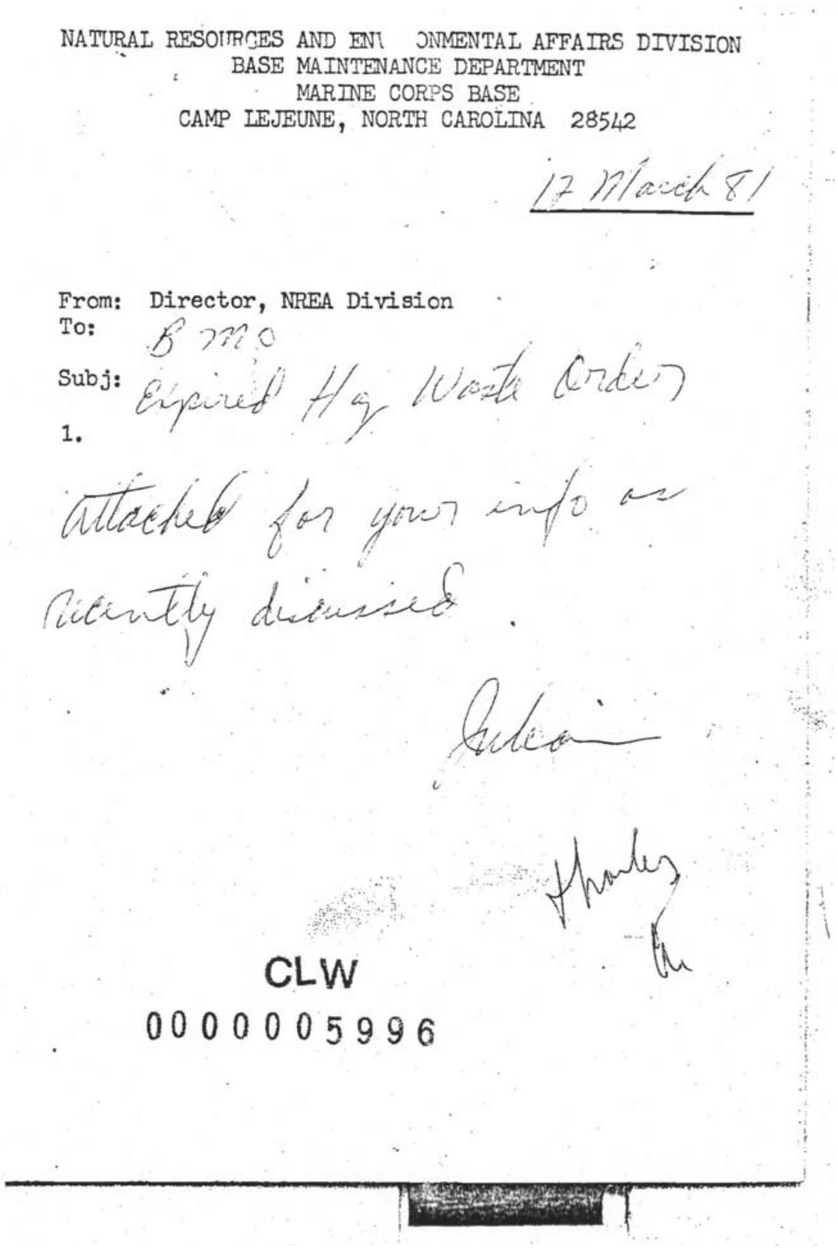
Before my diagnosis I had been a very productive person; I feel like such a burden to everyone especially my wife and daughter. I am no longer able to work due to the devastating side effects and physical limitations from my treatments and surgeries. The water contamination at Camp Lejeune has wreaked havoc on my family and me.

August 1, 2008 I received a letter from the Department of the Navy stating "unregulated chemicals were discovered in some of the base drinking water systems in the early 1980's at Camp Lejeune." The Hadnot Point Water Distribution system was one of those.

I then decided to move forward with genetic testing for the breast cancer gene (BRCA 1 and BRCA 2), which I tested negative for both. It was then that I really understood my cancer came from my chemical exposure due to the chemicals in the drinking water at Camp Lejeune.

The wells were discovered to be contaminated in1980 when I arrived, the Marines knew about it and said nothing, knowing full well we were bathing in and drinking contaminated water on a daily basis. The water reports all state that the wells were contaminated and action needed to be taken and nothing was done.

In March of 1982 a switch to Grainger Analytical Laboratories once again showed contamination and still nothing was done. I would also like to point out in 1974 the Base Commander declared "organic solvents as a hazardous substance" and then warned the commands at Camp Lejeune that improper disposal practices could result in the contamination of the drinking water. (Ref: Base Order 5100.13B)



NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS DIVISION
BASE MAINTENANCE DEPARTMENT
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542

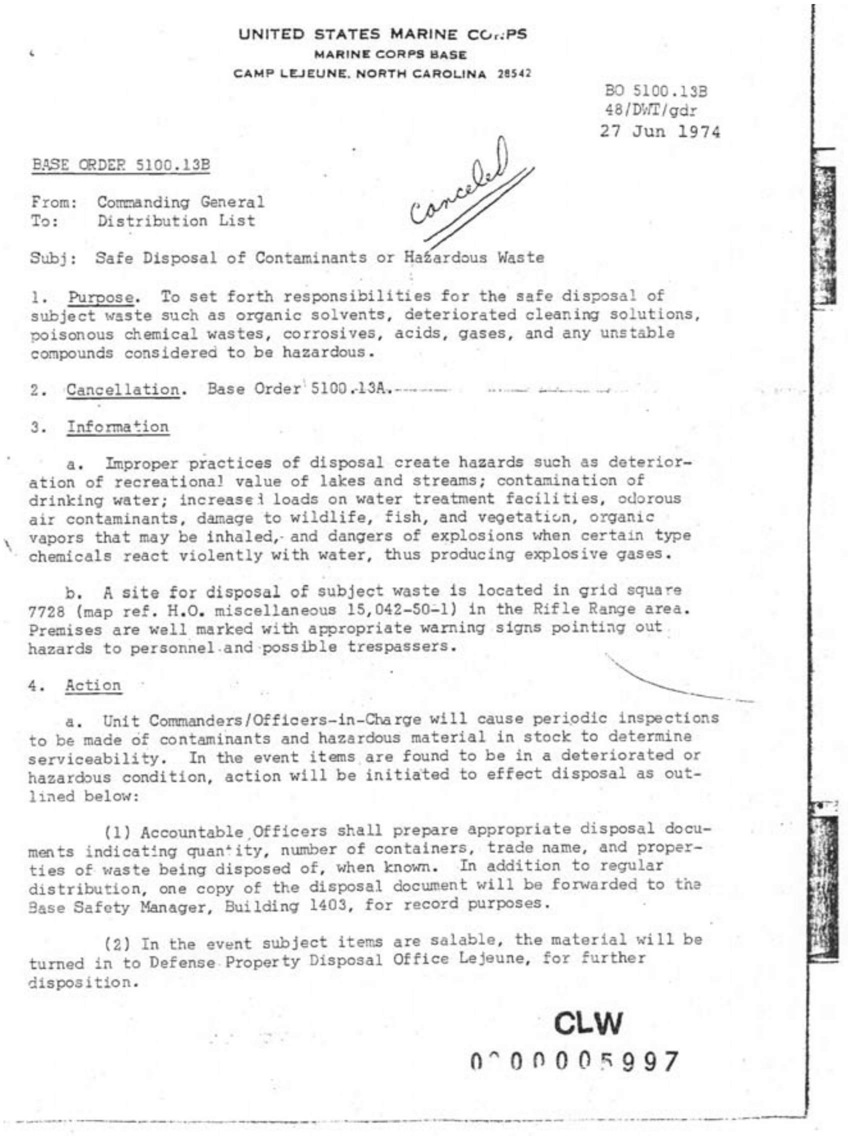
17 March 81

From: Director, NREA Division
To: BMO
Subj: Expired Haz Waste Order

1. attached for your info as recently discussed.

Julian

Thanks



UNITED STATES MARINE CORPS
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542

BO 5100.13B
48/DWT/gdr
27 Jun 1974

BASE ORDER 5100.13B

Canceled

From: Commanding General
To: Distribution List

Subj: Safe Disposal of Contaminants or Hazardous Waste

1. Purpose. To set forth responsibilities for the safe disposal of subject waste such as organic solvents, deteriorated cleaning solutions, poisonous chemical wastes, corrosives, acids, gases, and any unstable compounds considered to be hazardous.

2. Cancellation. Base Order 5100.13A.

3. Information

a. Improper practices of disposal create hazards such as deterioration of recreational value of lakes and streams; contamination of drinking water; increased loads on water treatment facilities, odorous air contaminants, damage to wildlife, fish, and vegetation, organic vapors that may be inhaled, and dangers of explosions when certain type chemicals react violently with water, thus producing explosive gases.

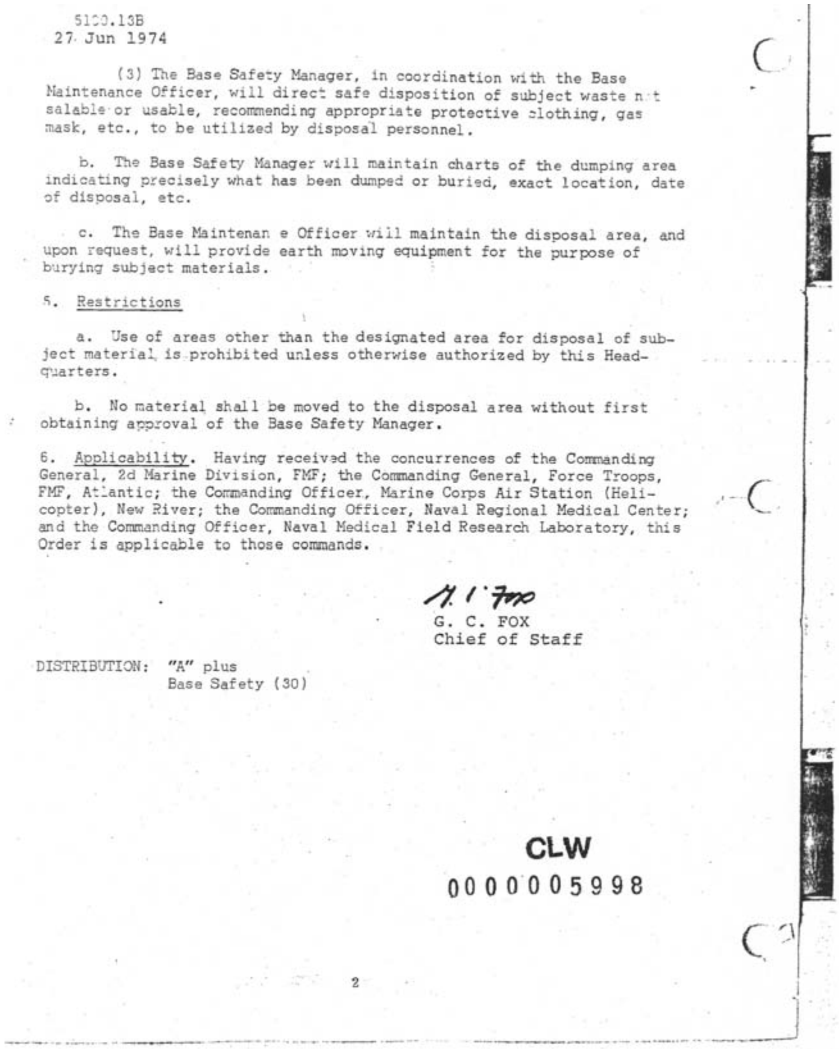
b. A site for disposal of subject waste is located in grid square 7728 (map ref. H.O. miscellaneous 15,042-50-1) in the Rifle Range area. Premises are well marked with appropriate warning signs pointing out hazards to personnel and possible trespassers.

4. Action

a. Unit Commanders/Officers-in-Charge will cause periodic inspections to be made of contaminants and hazardous material in stock to determine serviceability. In the event items are found to be in a deteriorated or hazardous condition, action will be initiated to effect disposal as outlined below:

(1) Accountable Officers shall prepare appropriate disposal documents indicating quantity, number of containers, trade name, and properties of waste being disposed of, when known. In addition to regular distribution, one copy of the disposal document will be forwarded to the Base Safety Manager, Building 1403, for record purposes.

(2) In the event subject items are salable, the material will be turned in to Defense Property Disposal Office Lejeune, for further disposition.



5100.13B
27 Jun 1974

(3) The Base Safety Manager, in coordination with the Base Maintenance Officer, will direct safe disposition of subject waste not salable or usable, recommending appropriate protective clothing, gas mask, etc., to be utilized by disposal personnel.

b. The Base Safety Manager will maintain charts of the dumping area indicating precisely what has been dumped or buried, exact location, date of disposal, etc.

c. The Base Maintenance Officer will maintain the disposal area, and upon request, will provide earth moving equipment for the purpose of burying subject materials.

5. Restrictions

a. Use of areas other than the designated area for disposal of subject material is prohibited unless otherwise authorized by this Headquarters.

b. No material shall be moved to the disposal area without first obtaining approval of the Base Safety Manager.

6. Applicability. Having received the concurrences of the Commanding General, 2d Marine Division, FMF; the Commanding General, Force Troops, FMF, Atlantic; the Commanding Officer, Marine Corps Air Station (Helicopter), New River; the Commanding Officer, Naval Regional Medical Center; and the Commanding Officer, Naval Medical Field Research Laboratory, this Order is applicable to those commands.

G. C. FOX
Chief of Staff

DISTRIBUTION: "A" plus
Base Safety (30)

CLW
0000005998

2

After receiving my letter in August in 2008, I filled out the USMC Water Registry as requested. It was then Mike Partain contacted me and let me know that I was the 7th man that was diagnosed with Male Breast Cancer that was in August of 2008. There are currently 64 men!

I originally filed a VA claim for benefits on Nov 11, 2008 to be denied in April 2009. I appealed the claim and requested a hearing, which I received in May 2010 in Boston, MA. I had 1 hour to present new information about my case with my doctors letters, and letters from Dr Clapp and Senator Kerry of Massachusetts.

My case was approved with 100% disability in August 2010. This will greatly help my wife, daughter and me and I hope the VA will continue to help veterans and civilians affected by the contamination.

Thank you for allowing me to speak.

BIOGRAPHY FOR PETER DEVEREAUX

My name is Peter Devereaux I am 48 years old and I currently reside in Massachusetts. I was in the Marines from September 10, 1980 until December 7, 1984. I was assigned to Marine Corps Base Camp Lejeune in North Carolina and lived in the French Creek area of Hadnot Point from December 1980 until April 1982 with the 8th Communication Battalion. I was diagnosed with breast cancer on January 11, 2008. Seven months later I received a letter from the U.S. Marine Corps on August 1st, 2008 informing me that I was exposed to unregulated chemicals at Camp Lejeune.

My breast cancer has since metastasized to my spine, ribs and hip. On August 6, 2010, the Department of Veterans Affairs (VA) granted me a 100% disability linking my breast cancer to toxic chemicals I was exposed to in the drinking water supply at Camp Lejeune during my military service.

Chairman MILLER. Thank you, Mr. Devereux. Mr. Devereux, Mr. Watters is not a Marine and you are. He said the Army has a slogan, "Leave no comrade behind" but did not know if the Marines have a similar slogan. Do the Marines have a similar slogan?

Mr. DEVEREUX. Yes. You know, semper fidelis, always faithful, and you never leave a man behind, absolutely. Always protect your own.

Chairman MILLER. Thank you.

Dr. Clapp, you are now recognized for five minutes.

STATEMENT OF DR. RICHARD CLAPP, PROFESSOR EMERITUS, DEPARTMENT OF ENVIRONMENTAL HEALTH, BOSTON UNIVERSITY SCHOOL OF PUBLIC HEALTH, ENVIRONMENTAL HEALTH POLICY CONSULTANT AND MEMBER OF THE ATSDR CAMP LEJEUNE COMMUNITY ASSISTANT PANEL (CAP)

Dr. CLAPP. Thank you, Mr. Chairman and Mrs. Dahlkemper and staff. I feel like I am an academic and almost never speak only for five minutes, but——

Chairman MILLER. Please try to keep it less than 50.

Dr. CLAPP. I think the real teachers have already spoken, so I will be brief.

In your letter to me dated September 1st, you asked me to address several questions, so I will limit my oral comments to those questions.

First, I became involved with Camp Lejeune issue in early 2006 when I was asked by ATSDR to provide epidemiologic advice to the Community Assistance Panel. In the past 4-1/2 years since that time, I have attended meetings of the CAP, as we call it, meetings of other scientific advisory panels convened by ATSDR and in particular looking at epidemiologic and water modeling issues. My training is in epidemiology.

In addition, I have given comments to the National Research Council of the National Academy of Sciences on their draft consideration of the issues regarding the Camp Lejeune water contamination and I was a peer reviewer on a draft of their document, and then subsequent to the release of their document in 2009, I and some colleagues of mine expressed our disappointment in that report, which I can provide to the committee if you are interested.

The three specific questions that you asked me to address were the degree of contamination at Camp Lejeune. I think we have already heard that the degree of contamination was extraordinary in Camp Lejeune during the period especially while the measurements that were available were actually reported, as Mike Partain has indicated. At least one measurement in 1982 showed that in one of the drinking water treatment plants there was a 1,400-parts-per-billion level of trichlorethylene in the drinking water, and this is about 280 times what would currently be allowed in drinking water in this country, and it is five times the level that was found at about that same time in the water in Woburn, Massachusetts, which was the location of a childhood leukemia cluster that was subsequently investigated by several agencies and about which there have been books and a movie.

So I think that this was an extraordinary amount of contamination and one of the members of a 2005 National Academy of Sciences panel said that this was the largest drinking water contamination of any population of humans in this country from trichlorethylene. It turns out trichlorethylene is a widespread contaminant in this country but this was specifically referring to a discrete population with very high levels of trichlorethylene. This is the largest such exposure in our country's history.

The second question that you asked me to address was, based on my experience as an epidemiologist, what types of health effects might be expected from this kind of contamination of these chemicals that have been documented and you documented, Mr. Chairman, and it would be in my view a variety of cancers, some of which have been mentioned here today—breast cancer in males and females, kidney cancer or renal cell carcinoma, non-Hodgkin's lymphoma, bladder cancer, and then some reproductive effects in the offspring including childhood cancer, in my view, and also adverse reproductive outcomes such as birth defects, small for gestational age children, et cetera. These have been listed actually in a feasibility study that was done by ATSDR staff. I have great respect for the ATSDR staff that have been working on this Camp Lejeune series of studies and their feasibility assessment actually lists a fairly long list of cancers and other adverse health effects that I would endorse.

And then the last question you asked me to address was, what steps might the Navy or the Department of Veterans Affairs take to determine presumptive disability in Camp Lejeune veterans, and the veterans themselves can avail themselves of the VA and the appeal process which has been described by two of the previous witnesses, and so I think that is already in motion. It is a case-by-case thing. I have participated in some of those cases myself as an expert providing information, but that takes too long, and I think that Congress needs to act, and an act that was done for Vietnam Veterans, the Agent Orange Act of 1991, may provide a model for actions such as could be taken with respect to Camp Lejeune.

I understand there is an act that has been proposed. I don't—I am not going to comment on the details of that. I am not a legislator nor have I ever been a staff member, but either of those approaches seems to me would move this forward.

Thank you for your time.

[The prepared statement of Dr. Clapp follows:]

PREPARED STATEMENT OF RICHARD CLAPP

I became involved with the Camp Lejeune issue in early 2006 when I was asked by ATSDR to provide epidemiologic advice to the Community Assistance Panel. In the past four and a half years, I have attended meetings of the CAP, meetings of other scientific advisory panels convened by ATSDR whose work focused on epidemiologic and water modeling issues at Camp Lejeune. In addition, I went on a tour of Camp Lejeune in February, 2008 and saw the various contamination sites and base components. Also in 2008, I provided input to the National Research Council committee considering the Camp Lejeune issues, and in 2009, I provided peer review comments to the NRC prior to release of its report.

1. The degree of **contamination of drinking water at Camp Lejeune in the years between 1957 and 1985 is the highest I have observed in my career as an environmental epidemiologist. For example, the trichloroethylene concentration found in drinking water from one treatment plant in 1982 was 1,400 parts per billion. This is two hundred and eighty times the current allowable level of TCE in drinking water in the U.S.** It is more than five times the highest level found in well water in Woburn, Massachusetts at about the same time as the childhood leukemia cluster was identified in that town.

A member of a 2005 National Academy of Sciences panel assessing the scope of contamination issues at Camp Lejeune described it as the largest human exposure to TCE from drinking water in this nation's history. There were hundreds of thousands of Marines, civilians and dependents exposed to a variety of contaminants over nearly three decades at Camp Lejeune. The historical reconstruction and modeling of the likely extent of the exposure is not completed, but it is already clear that this is an unprecedented situation that demands the level of attention that it is currently getting from the Committee.

2. Once the exposure modeling has been completed, **it will be possible to examine the patterns of mortality from a wide range of cancers, including breast cancer, kidney cancer, and other diseases. The final water model can also be used in on-going studies of adverse reproductive outcomes and childhood cancer and in potential studies of other non-fatal conditions such as some cancers, kidney diseases, autoimmune diseases such as lupus and scleroderma, and neurological diseases such as Parkinson's Disease.** The mortality study recommended in 2005 is currently underway and will likely be very informative. Additional studies of non-fatal conditions will depend on the outcome of a health survey which is also underway.

3. Some of the **steps that might be taken by the Navy or the Dept. of Veterans Affairs to determine presumptive disability in Camp Lejeune veterans have already begun.** According to a presentation made to the Community Assistance Panel earlier this year, the VA considers veterans to have been "exposed" if they were resident at Camp Lejeune during a specific time period. The next requirement under the current VA procedures is a "nexus letter" from a competent medical authority that connects the specific disease or condition claimed by the veteran to the exposures documented at the base. This currently happens on a case-by-case basis and undoubtedly differs from one region or local office to another.

A more comprehensive approach could be taken along the lines of the Agent Orange Act of 1991. This legislation listed three conditions (two cancers and chloracne) that would be considered service-connected in those veterans who could document service in Vietnam. It also established a process for periodically reviewing the literature about other health effects and adding to the list of Vietnam Agent Orange service-connected diseases or conditions. This review is conducted by independent panels established by the National Academy of Sciences and has resulted in several biannual reports and a longer list of compensable diseases over the past two decades. I have participated in various stages of the Vietnam veterans Agent Orange compensation program and I recommend it for your consideration.

In addition to the above points, I was asked to comment on the 1997 Public Health Assessment of Camp Lejeune released by ATSDR. This was retracted in 2009 once it was revealed that a much larger amount of benzene had been released into the ground than was recognized at the time of the original report. The decision to retract the report was clearly required by the facts, but it would not have been necessary had the full extent of the benzene contamination been known in 1997. The recent information will need to be incorporated into the water exposure model used in the on-going and proposed health studies.

BIOGRAPHY FOR RICHARD CLAPP

Dr. Clapp received his MPH degree from the Harvard School of Public Health in 1974 and his D.Sc. Degree in Epidemiology from B.U. School of Public Health in 1989. He was the founding Director of the Massachusetts Cancer Registry in the Department of Public Health from 1980–1989. Dr. Clapp has worked at two non-profit consulting companies, the JSI Center for Environmental Health Studies, and Tellus Institute. He joined the B.U. School of Public Health Environmental Health Department as a full-time Faculty member in 1993, where he is now Professor Emeritus. He is also on the Adjunct Faculty at the U. of Massachusetts—Lowell School of Health and Environment.

Dr. Clapp has done research and taught courses in epidemiology and environmental health. His research interests included the health effects of dioxin and Agent Orange, the health effects of ionizing and non-ionizing radiation, and other environmental exposures to toxic chemicals. He is a member of several professional organizations and served as an Associate Editor of Environmental Health Perspectives. Dr. Clapp is a member of the Community Assistance Panel for the Camp Lejeune health studies, for which he receives compensation from ATSDR.

Chairman MILLER. Thank you, Dr. Clapp.

Mr. Hargett, you are now recognized for five minutes.

STATEMENT OF MICHAEL HARGETT, GENERAL DIRECTOR, ANCHIMERIC ASSOCIATES AND FORMER CO-OWNER OF GRAINGER LABORATORIES

Mr. HARGETT. Thank you, Mr. Chairman. I appreciate this opportunity to discuss the drinking water analyses performed by Grainger Laboratories at the request of the United States Marine Corps at Camp Lejeune.

I am a former co-owner and vice president of Grainger Laboratories in Raleigh, North Carolina. Grainger Laboratories was founded in 1973 to provide analytical and consulting services to industry, government and commercial customers throughout the southeastern United States. Our services include drinking water analyses that were certified under the Safe Drinking Water Act, otherwise designated as Public Law 92–523. That Act has subsequently been amended and expanded several times.

The Safe Drinking Water Act applies to every public water system in the United States. There are currently more than 160,000 public water systems regulated by the Safe Drinking Water Act providing water to almost all Americans at some time during their lives. Safe Drinking Water Act and derivative legislation define public water systems as an entity that provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days per year.

The Safe Drinking Water Act was at that time, at the time of our service to the Corps administered by the State of North Carolina, Public Water Supply Section of the Department of Environmental and Natural Resources. They had a Water Supply Protection Program under a primacy agreement with the Environmental Protection Agency.

In 1970, Executive Order 11514 for Protection and Enhancement of Environmental Quality directed the Federal Government to provide leadership in protecting and enhancing the quality of our Nation's environment and to sustain and enrich human life. As a result, federal agencies initiated measures to direct their policies, plans and programs so as to meet national environmental goals. The Safe Drinking Water Act included clearly established goals that instituted standards for water quality, supply and appropriate distribution practices throughout the United States.

United States Marine Corps personnel at Camp Lejeune initiated discussions with my office in 1982 to determine their compliance with the Safe Drinking Water Act. Over the months that followed, our team assisted personnel in defining their compliance with the expectations of the State of North Carolina and also the Safe Drinking Water Act. We assisted them in identification and quantification of contaminants in the drinking water and discussed operating practices that could avoid exposure for the Marines, dependants and base personnel that were consuming this potable water supply.

Copies of our analytical reports and correspondence with base personnel have been provided to this committee and agencies and contractors reviewing the history of water quality at the base and its associated housing units. Additional telephone discussions, trips to the base for meetings with utility personnel, and an attempt to bring to the attention of base personnel the implications of the contaminated water were included in our support to the base utility program.

The initial requests from the base required a statement of our qualifications as a certified laboratory to perform trihalomethane analysis under the Safe Drinking Water Act, sampling instructions, a formal price quotation and special sample containers that were both suitable and compliant with the established protocols for sampling, transport and preservation of the samples. The sampling required a bottle that would avoid the collection of bubbles or an air space so as to minimize the volatilization of the water content. This was a special technique that needed to apply a septum or membrane to the mouth of the bottle, and the sampling method was new to many utility personnel and frequently, training, re-sampling, sampling again and discussions were required from our office to make sure that we had a representative sample.

The first set of samples we received from the base were not in compliance with the Safe Drinking Water Act and had a very significant interference present. This interference was exceptional, and after discussions with the analytical chemist, Mr. Bruce Babson, and his supervisor, Mr. Paul Brafford, we decided to request an additional set of samples from the base. A second set of samples presented similar results. In discussions with our management team, a decision to define the interference at the expense of our company was made and chlorinated solvents were identified. We also determined the level of contamination in each of the samples. A decision to visit the base and initiate discussions. This decision was based on the potential health effects for the contaminants.

I visited the base myself with fresh sample bottles and met with the base chemist, a Ms. Betsy Betz, to obtain a third set of samples and discuss the implications of the contaminated water. Chlorinated solvents in the drinking water was deemed a hazard to consumers at the base and warranted delineation, control and mitigation of the risk. A third set of samples taken by myself was also not in compliance with the Safe Drinking Water Act and a monthly sampling for trihalomethanes was initiated. A campaign to define the well or wells generating the highest levels of trihalomethanes and the chlorinated solvents was also started. From the analytical results, you can see that the wells with the highest levels of chlorinated solvents were clearly established.

In a letter of August 10, 1982, Ms. Betz points out the health effects of exposure to the chlorinated solvents present in the drinking water and she appropriately points out that the pollutants are unregulated at that time. Her repeated reference to the toxicity of chlorinated solvents demonstrates concern and an awareness of the importance of the issue. I must ask why this urgent alarm was unanswered. Exposure to chlorinated solvents included liver, kidney, nervous system, and other disruptions to human physiology.

Another trip to the base was made to meet with the water well operators who were civilian employees. They were responsible for the daily operation of the wells. We visited the wells with chlorinated solvents and discussed potential sources of the contamination. Information including hydrogeological data was not available that would have assisted in this determination. At the conclusion of the field discussions, I strongly suggested to Ms. Betz and the operator that the well field operation avoid those wells with high chlorinated solvent concentrations. It was agreed that it was a good idea and to quarantine that source. Afterward, in discussions with Ms. Betz, the health effects and issues of Safe Drinking Water Act compliance were further discussed.

One week later, Ms. Betz called my office to request that I come to the base and meet with base personnel—base utility personnel. I agreed to do so and suggested that would be a good time for an additional sampling. We met with the deputy utilities manager. This person was a uniformed lieutenant colonel, and after much deliberation I am unable to remember his name but I do remember being ushered into his office, the introduction by Ms. Betz introducing me as a person that was very familiar with water supplies in eastern North Carolina, compliance with the Safe Drinking Water Act, State of North Carolina, requirements, and stating that I was present to discuss the water quality issues at Hadnot Point and other residential supplies. The lieutenant colonel responded that this was something he would have to look into and we were summarily dismissed. The total time in the lieutenant colonel's office was less than five minutes.

Following the meeting, Ms. Betz apologized for the brusque treatment and explained that others would have to know about the problems. We went on to obtain additional samples that did show improvement in compliance with the Safe Drinking Water Act and a lower chlorinated solvent concentration. The operating well field conditions and parameters were unknown to me at the time of sampling.

Sampling continued, and a few months later an engineer from the State of North Carolina, Mr. Mike Bell, asked me if Grainger Labs was performing the certified analyses for the Marine Corps Base. I responded yes, and he asked for a copy of the analysis. I said I could not provide this report since it was the property of the government and I provided him contact information for Ms. Betz. A few weeks later at a meeting of the American Water Works Association state chapter, Mr. Chuck Rundgren, who was the chief of the water supply branch and Mr. Bell's supervisor, again asked me the same question. I gave him the same response and he asked if I had provided any recommendations to the base. I replied, "Yes, and I hope your new field office in Wilmington is working with them." Mr. Rundgren replied that they were. I further replied that base needed assistance and his department would be of great value.

I left the laboratory in 1984 and the company was sold in 1985. Until being contacted my Mr. Mike Partain in 2009, I am unaware of any communications concerning the water quality at the base, our analysis, recommendations for water quality improvement or supplemental discussions being directed to myself or former employees of Grainger Labs.

Subsequent to leaving Grainger Labs, I continued an active profile in environmental compliance and consulting work and that included discussions with U.S. Navy personnel at the Atlantic Division, known as LantDiv, who were responsible for environmental cleanup at the base. I remember asking about the contaminated drinking water and being told that there were several problems to be addressed at the base. No details were provided except a passing reference that a dry cleaning operation near the base was determined to be responsible for some of the contamination.

It is disappointing to know of an absence of response by the Marine Corps to the contaminated water conditions. I attribute this to be a lack of knowledge surrounding the Safe Drinking Water Act, conventional water utility operations and an unawareness of the toxicological potential of the contaminants. In retrospect, I genuinely regret that my organization and myself were not more diligent in presenting this hazard to base personnel for surely many would have been saved from this health hazard, the exposure, and if the Marine Corps was more alert and committed to corrective actions. The Marine Corps explanation in their historic dinking water brochure does not account for a direct historic perspective of the water quality and the exposure of base personnel. Instead, a reactive profile for corrections after the exposure of base personnel is present. There is no question that military personnel, dependants, and base personnel were exposed to a hazard and that corrections were eventually accomplished. The poor interest from the utility manager leads me to believe that the corrective actions were certainly slow and due to a lack of knowledge. I also question what the independent research initiative referenced in the brochure could accomplish with a literature study and no review of compliance analysis of the drinking water supply.

The presence of any contaminant in a potable water supply should drive a diligent pursuit of the source of the contamination. The fact that a contaminant is not a regulated compound is not a reason to simply ignore it. That indicator says there is something else in the water, there is a source, and in normal operations, the practice is to pursue that source, define it completely and certainly quarantine that water supply until you make that determination.

Most of the U.S. military bases were established as enclaves that were independent and self-sufficient. These same bases are now commonly bordered by municipalities with utility options that are superior to current base operations. The recent move for privatization by the Department of Defense may solve many of these operational problems.

With whatever path the utility operations for military facilities is improved, an oversight should continue to assure that the well-being of military personnel, their dependants and base personnel will be sustained.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Hargett follows:]

PREPARED STATEMENT OF MICHAEL C. HARGETT

Subject: Drinking Water Analysis Performed by Grainger Laboratories for the United States Marine Corps Base, Camp Lejeune, North Carolina

I am Michael C. Hargett a former co-owner and vice president of Grainger Laboratories in Raleigh, NC. Grainger Laboratories was founded in 1973 to provide analytical and consulting services to industry, government and commercial customers in the southeastern United States. Our services included drinking water analyses that were certified under the Safe Drinking Water Act (SDWA) otherwise designated as Public Law 92–523.

The SDWA applies to every public water system in the United States. There are currently more than 160,000 public water systems regulated by the SDWA providing water to almost all Americans at some time in their lives. The SDWA and derivative legislation define public water system as an entity that provides "water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year."

The Safe Drinking Water Act was, at the time of our service to the US Marine Corps Base at Camp Lejeune, North Carolina (MCB) administered by the State of North Carolina, Public Water Supply Section of the Dept. of Environmental and Natural Resources, Water Supply Protection Program under a Primacy agreement that is still in place today.

In 1970 Executive Order 11514 for Protection and enhancement of environmental quality directed The Federal Government to provide leadership in protecting and enhancing the quality of the Nation's environment to sustain and enrich human life. As a result, Federal agencies initiated measures to direct their policies, plans and programs so as to meet national environmental goals. The SDWA included clearly established goals that instituted standards for water quality, supply and distribution throughout the United States.

In 1974 Congress enacted the Safe Drinking Water Act (SDWA) (P.L. 93–523, 88 Stat. 1660) to protect the quality of both actual and potential drinking water in the United States. Congress had created the SDWA in response to a nationwide survey that revealed health risks from inadequate public water-supply facilities, polluted supplies, and operating procedures that did not achieve a safe water quality. To achieve its goal the SDWA provides water quality standards for drinking-water suppliers, protects underground drinking-water sources, and directs appropriate deep-well injection of wastes.

The SDWA requires the U.S. Environmental Protection Agency (EPA) to regulate all "public water systems," defined as systems that provide piped water for human consumption for at least sixty days a year to at least fifteen service connections or twenty-five people. The EPA does this through Primary Drinking Water Regulations, by which it first identifies contaminants that may pose a risk to human health and that occur in drinking water at potentially unsafe levels. Then the EPA specifies a Maximum Contaminant Level Goal (MCLG) for each contaminant, which is set at the level below which there is no predicted health risk. Finally the EPA creates a legally enforceable Maximum Contaminant Level (MCL), which is the greatest amount of contaminant that will be allowed in the public water supply. This MCL must be set as close as is feasible to the MCLG after taking into account the best technology, treatment techniques, and costs. Since the 1996 amendments discussed below, the EPA may instead require a Treatment Technique for removing the contaminant if there is neither an economically or technologically feasible MCL, nor an accurate way to measure the contaminant in water.

States generally obtain primary authority to implement the SDWA after proving to the EPA that they will adopt and enforce standards at least as stringent as the national standards. While the states may oversee the program, the public water systems themselves physically ensure the safety of the tap water through treatment, testing, and reporting. In addition to these "at the tap" protections, the SDWA requires states and public water suppliers to protect initial water sources from contamination. In particular, the SDWA provides for an Underground Injection Control (UIC) program to prevent contamination of underground water sources by underground injection of contaminated fluids.

Due to criticism that the original act was an inflexible, unfunded mandate with an unattainable regulatory schedule, the 104th Congress extensively amended the act in 1996 (P.L. 104–182, 110 Stat. 1613). These amendments included new pollution prevention approaches, public information requirements, added flexibility to the regulatory process, and a Drinking Water State Revolving Fund. Pollution prevention took the form primarily of source-water quality assessment programs to determine the current health of water supplies and delineate the area to be protected. In addition, public water suppliers were required to inform their year-round customers about the source and quality of their tap water with an annual consumer confidence report.

The most important element of the amendments was the critically necessary funding mechanism added to the SDWA's stringent water quality requirements. This fund provided federal monetary aid to public water systems to repair and upgrade their facilities, focusing particularly on assisting small and disadvantaged communities that might otherwise find these repairs too expensive. The fund also gave priority to programs using pollution prevention to safeguard their drinking water supply.

US Marine Corps Base personnel at Camp Lejeune, NC initiated discussions with my office in 1982 to determine compliance with the SDWA. Over the months that followed, our team assisted base personnel in defining their compliance with the expectations of the State of North Carolina and the SDWA, identification and quantification of contaminants in the drinking water supply, and discussions on operating practices that could avoid exposure for the Marines, dependants, and base personnel that were consuming this potable water supply.

Copies of our analytical reports and correspondence with base personnel have been provided to this committee and agencies and contractors reviewing the history of water quality at the base and its associated housing units. Additional telephone discussions, trips to the base for meetings with utility personnel, and an attempt to bring to the attention of base utility personnel the implications of the contaminated water were included in our support of base personnel.

The initial requests from the base required a statement of our qualifications as a certified laboratory to perform Trihalomethane (THM) analysis under the SDWA, sampling instructions, a formal price quotation, and special sample containers that were both suitable and compliant with established protocols for sampling, transport and preservation of the samples. The sampling required a sample withour bubbles or an air space above the sample to minimize volitization of the water content. A special technique was needed to apply a septum to the mouth of the sampling container for a full sample and later extraction through the septum without contaminating or releasing the targeted analytes. The sampling method was new to many utility personnel and frequently, training, resampling and discussions were needed to establish a representative sample.

The first set of samples we received from the base were not in compliance with the SDWA and had a significant interference present. This interference was exceptional and after discussions with the analytical chemist, Mr. Bruce Babson and his supervisor, Mr. Paul Brafford, we decided to request additional samples from the base. A second set of samples presented similar results. In discussions with the Grainger Laboratories management team, a decision to define the interference at the expense of our company was made and the chlorinated solvents were identified and the contamination level was established. A decision to visit the base and initiate discussions resulted.

I visited the base with fresh sample bottles and met with the Base Chemist, Ms. Betsy Betz, to obtain a third set of samples and discuss the implications of the contaminated water. Chlorinated solvents in the drinking water was deemed a hazard to consumers at the MCB and warranted delineation, control and mitigation of the risk. The third set of samples taken by myself was also not in compliance with the SDWA and the monthly sampling for THM. A campaign to define the well or wells generating the highest levels of THM and chlorinated solvents was started. From the analytical results you may see that the wells with chlorinated solvents were established.

In a letter of August 10, 1982, Ms. Betz points out the health effects of exposure to the chlorinated solvents present in the drinking water and she appropriately points out that the pollutants were unregulated at that time. Her repeated reference to the toxicity of the chlorinated solvents demonstrates concern and an awareness of the importance of the issue. I must ask why this urgent alarm was unanswered. Exposure to chlorinated solvents incuded liver, kidney, nervous system, and other disruptions to human physiology. A more precise definition of the toxicological burden of these chemicals can be addressed by experts in this arena.

Another trip to the base was made to meet with the water well operators (maintenance personnel) who were responsible for the wells. We visited the wells with chlorinated solvents and discussed potential sources of the contamination. Information including hydrologic data was not available that could assist in this determination. At the conclusion of the field discussions, I strongly suggested to Ms. Betz and the operator that the well field operation avoid the wells with high chlorinated solvent concentration. It was agreed that it was a good idea to quarantene this source. Afterwards, in discussions with Ms. Betz, the health effects and issues of SDWA compliance were discussed.

A week later, Ms. Betz called my office to request that I come to the base to meet with base utility personnel. I agreed to do so and suggested that an additional sampling of current water quality would be appropriate. A meeting with the Deputy Utilities Manager for the base was set for the next week. This person was a Lt. Col. and after much deliberation I am unable to remember his name but I do remember being ushered into his office, Ms. Betz introducing me as a person that was very familiar with water supplies in eastern North Carolina, compliance with the SDWA and State of NC requirements, and stating that I was present to discuss the water quality issues at Hadnot Point and other residential water supplies. The Lt. Col. responded that this was something he would have to look into and we were dismissed. The total time in the Lt. Col.'s office chair was less than 5 minutes.

Following the meeting, Ms. Betz apologized for the brusk treatment and explained that others would have to know about the problems. We went on to obtain additional samples that showed an improvement in compliance with SDWA and lower chlorinated solvent concentrations. The operating well field conditions and parameters were unknown at the time of sampling.

Sampling at the MCB continued and a few months later, an engineer with the State of NC, Mr. Mike Bell, asked me if Grainger Laboratories was performing the water analysis for the MCB. I responded yes and he requested a copy of the analysis. I said I could not provide this report since it was the property of the Government and I provided the contact information for Ms. Betz. A few weeks later at a meeting of the American Water Works Association State Chapter, Mr. Chuck Rundgren, Chief of the Water Supply Branch and also Mr. Bell's supervisor, asked me the same question. I gave him the same response and he asked if I had provided any recommendations to the base. I replied ," . . . . .yes, and I hope your new field office in Wilmington is working with them." Mr. Rundgren replied that they were. I further replied that they (MCB) needed assistance and his department would be of great value to them. No further discussion with NC Government personnel concerning the MCB is recalled.

I left the laboratory in 1984 and the company was sold in 1985. Until being contacted my Mr. Mike Partain in 2009, I am unaware of any communications concerning the water quality at the MCB, our analysis, recommendations for water quality improvement, or supplemental discussions directed to myself or any other former employees of Grainger Laboratories.

Subsequent to leaving Grainger Laboratories, I continued an active profile in environmental compliance and consulting work that included discussions with U.S. Navy personnel at the Atlantic Division (LANTDIV) who were responsible for environmental cleanup at the MCB. I remember asking about the contaminated drinking water and being told that there were several problems that were to be addressed at the base. No details were provided except passing reference that a dry cleaning operation near the base was determined to be responsible for some of the contamination.

It is disappointing to know of an absence of response by the MCB to the contaminated water conditions. I attribute this to be a lack of knowledge surrounding the SDWA, conventional water utility operations and an awareness of the toxicological potential of the contaminants.

The Marine Corps explanation in the Camp Lejeune Historic Drinking Water brochure does not account for adirector historic perspective of the water quality and the exposure of base personnel. Instead a reactive profile for corrections after the exposure of base personnel is present. There is no question that military personnel, dependents, and base personnel were exposed to the hazard and that corrections were eventually accomplished. The poor interest from the Deputy Utilities Manager leads me to believe that the corrective actions were slow. I also question what the independent research initiative could accomplish with a literature study and no review of the compliance analysis of the distributed water supply;.

Most of the US military bases were established as enclaves that were independent and self-sufficient. These same bases have now been surrounded by municipalities with utility operations that are superior to the independent, underfunded base utilities and with a higher quality set of resources than the Government installation. This deficiency is the responsibility of the US Congress and Department of Defense management.

During the last 15 years the Congress has moved to privatize military base electrical, gas, water, wastewater and other utilities to commercial and utility companies with superior operational knowledge, engineering, system capabilities, and financial resources. It is possible that this transfer of Federal assets will improve the quality of utility operations including water supply to insure reliable, consistent water quality for our base personnel.

With whatever path the utility operation for military facilities is improved, an oversight that assures the well being of military personnel, their dependants, and base personnel must be sustained.

Thank you for this opportunity to address the committee and support its interest in the well being of the US warfighter.

BIOGRAPHY FOR MICHAEL C. HARGETT

Mr. Hargett holds an undergraduate Bachelor of Science in Zoology and Masters Degree in Microbiology from North Carolina State University. For the last thirty eight years he has worked to apply new technologies to environmental challenges. He has been active in testing, evaluation, feasibility, demonstration and application of advanced technologies providing economical, reliable options for industrial, government and institutional compliance and environmental remediation problems.

Mr. Hargett has successfully used innovative new solutions for his work with municipal and industrial water and wastewater plants, super-fund site remediation, hazardous waste minimization, chemical weapons demilitarization, Chemical-Biological-Radiological-Nuclear-explosives protection and security, and refining of radioactively contaminated materials from nuclear operations for beneficial reuse as clean/safe metals.

He is currently the General Director of Anchimeric Associates and provides consulting services for new technologies in emerging markets. His responsibilities include sponsorship, strategic planning and leadership of new products, technologies and programs for environmental problems and challenges.

Chairman MILLER. Thank you, Mr. Hargett.

At this point we will begin our first round of questions. We will probably be interrupted by votes in a short while. The Chair now recognizes himself for five minutes.

Dr. Clapp, I am not sure I have seen two witnesses' testimony that was as different as yours and General Payne's. In his written testimony, he says, "Currently, scientific studies haven't determined reliably whether diseases and disorders experienced by former residents and workers at Camp Lejeune are associated with their exposure to contaminants in the water supply because of data shortcomings and methodological limitations." Do you agree with that?

Dr. CLAPP. Well, the studies of Camp Lejeune residents and family and dependants are still ongoing, so I suppose there are no finished—well, even studies that are finished are now being reevaluated because of additional information about what was in the water, so what we have to look at in coming to some kind of determination in this matter is other places where people have been exposed to these same chemicals. There is plenty in the literature about trichlorethylene, perchlorethylene and benzene and their health effects. So I guess it is true that the full scope of Camp Lejeune resident and dependent studies is not finished yet but that doesn't mean we don't know enough to act.

Chairman MILLER. So knowing what you do about the extent of the exposure, the levels of contamination of TCE, PCE and benzene, do you think it is correct that we do know that there are consequences?

Dr. CLAPP. Absolutely, yes.

Chairman MILLER. Okay. Also in his testimony, General Payne said, “I want to begin by saying that the welfare of our Marines, their family members and our civilian employees is always of paramount importance to us in an organization and as individual Department of the Navy leaders,” but at the same time does discuss the lack of regulations, that these chemicals were not subject to regulations, the Safe Drinking Water Act at the time. Mr. Hargett makes that point in his testimony. What was the state of the science in the early 1980s about the effect of TCE and PCE, even if they were not specifically forbidden by the Safe Drinking Water Act? What did we know about the consequences of exposure to those chemicals?

Dr. CLAPP. Well, and benzene. Benzene a lot was known about by the early 1980s. TCE was, as I mentioned, the contaminant of most concern in Woburn, Massachusetts, and that came to national attention in 1979, and in the early 1980s there were several studies actually, one by the state health department, one by researchers at Harvard School of Public Health, and the Dana Farber Cancer Institute, that suggested a number of childhood illnesses and childhood leukemia were associated with exposure to contaminated water, primarily with trichlorethylene, and that was known in the early 1980s. Studies in New Jersey had been done, or either had been done or were underway at that point, again showing adverse reproductive outcomes in people who lived in towns that had contaminated drinking water. Colleagues from ATSDR previously worked at the New Jersey Health Department and carried out those studies. So I would say that there was some convincing evidence in the early 1980s that these kinds of things in drinking water were harmful for at least children and perhaps adults as well. And then for workers, lots was known about both of these chemicals, all three of these chemicals.

Chairman MILLER. Mr. Partain, perhaps with the exception of lawyers and perhaps some of the ATSDR experts, you probably know more than anybody about the documents, Camp Lejeune’s documents. You have emphasized in your testimony that many of the documents about the contamination of the drinking water have really just become public in the last year. Do you believe that the failure to discover those documents was that the Navy simply didn’t know they had them or what do you think?

Mr. PARTAIN. Well, as the polluter, the Navy and the Marine Corps have the responsibility to retain these documents and know what they have, and this electronic portal that was discovered accidentally by ATSDR in March of 2009 was a repository for the Hadnot Point fuel farm UST program and contained in that repository was the documentation that the fuel loss at Hadnot Point was 1.1 million gallons of fuel. Now, prior to discovery of this information in that portal, the Marine Corps had informed the media, the public, Congress that according to their inventory records, up to 50,000 gallons of fuel had been lost at Hadnot Point. There is a big disparity between 50,000 gallons and 1.1 million gallons of fuel in the groundwater, and I would like to see the Navy and the Marine

Corps produce written notification—or, I am sorry—produce documents, written documents showing that they notified the Marine Corps—I mean the ATSDR of this information, which has affected their studies.

Chairman MILLER. Thank you, Mr. Partain.

My time is expired. I am going to set a good example to others. I will now recognize Dr. Broun for five minutes.

Mr. BROUN. Thank you, Mr. Chairman.

I would like to ask the three patients, I consider patients, as well as your testimony, and I apologize for having to leave for a few minutes; I am very well aware of your testimony, but what is your assessment of the claims appeals process in which you have participated and succeeded as well as the ongoing status of disability approval for the rest of Camp Lejeune veterans? Let me start with Mr. Partain.

Mr. PARTAIN. Well, as a dependant child of a Marine officer, I do not qualify for VA care nor have I made a claim in the VA because of that. My care was given to me through my private insurance I had with my employer, and even with that, it put my family to the brink of bankruptcy.

I have talked to Mr. Devereux and some of the other veterans who have gone through the VA process, and it has been nothing short of a nightmare, from what I understand. A lot of these people that do put the claims in are denied. Many of them give up and walk away thinking that there is no way they can prove this. They are frustrated by their medical doctors, you know, not being able to provide a nexus letter because of, for lack of a better word, fear that they will be ridiculed in the professional community.

Mr. BROUN. Mr. Devereux.

Mr. DEVEREUX. Yeah, I want to just say not only is it personally devastating to be diagnosed with something like this and then you feel like you have to beg, you know, for something like you have to prove that you are right, you know. It was really not only am I am physically challenged now, of course financially, it affected my family tremendous. We made unbelievable changes. So it was very difficult to go through this process, and I really hope that they can speed up the process for people. There is a lot of people in my situation that unfortunately don't have a lot of time to live based on the past results, you know, so it would be nice if they could really expedite the process for a lot of people and I commend them for at least allowing me benefits and a few other people. I hope they can continue this type of action in a more speedy process.

Mr. BROUN. Mr. Watters?

Mr. WATTERS. My experience with the VA claims process was that the denials I got apparently came from people who were extremely inexperienced. There were lots of errors, lots of mistakes in the written reason for the denials, and it was only when I was able to talk with a decision review officer who is a senior person who has much more experience that I was able to get the message across.

The other thing is, as I mentioned, I had resources available to me in the medical school that most veterans don't have. Had I not had those, I would still be fighting with the Veterans Administration on my claim. I think the speed of the process or the slowness of the process is a major issue, and as Mr. Partain knows, I had reached a level of frustration and I even stated this in writing, I was planning on going down to the VA office in Waco. I was going to publicly announce a hunger strike. I was going to stop all of my cancer medications in order to try to speed the process and get someone at the VA at the regional office in Waco to listen to what I had to say.

Mr. BROUN. Thank you, sir.

Certainly, as one who believes very strongly in fulfilling the government's promise to veterans and their families, I am very eager to pursue this further with all of you all because I believe very firmly that the VA needs to take care of our veterans, once they have left the military, and their families also. It is a sacred duty that we have.

Dr. Clapp, you suggested the Department of Veterans Affairs determine a presumption classification for veterans exposed while they were residents at Camp Lejeune similar to legislation that established the classification for Agent Orange. What is the difference in the scientific knowledge between these cases and how many veterans make claims to the VA for diseases resulting from exposure to Agent Orange before Congress passed that legislation?

Dr. CLAPP. Two very complicated questions. The state of the knowledge——

Mr. BROUN. You have 16 seconds to answer.

Dr. CLAPP. I would say the state of the knowledge is comparable actually. When we started out with the Agent Orange Act in 1991, there was quite a bit of published literature by then, including some of my own.

And then how many claims have been filed by Agent Orange exposed, I don't have that off the top of my head. The VA certainly can tell you that.

Mr. BROUN. Thank you so much.

Mr. Chairman, my time is expired. I yield back.

Chairman MILLER. Thank you.

Mrs. Dahlkemper is recognized for five minutes.

Mrs. DAHLKEMPER. Thank you, Mr. Chairman.

I want to thank all of you for being here today. I am from western Pennsylvania, a fair distance from Camp Lejeune but I have a gentleman in my district who I have met who spent time at Camp Lejeune named Cliff Armstrong who has suffered terrible ailments which he believes are a direct result of the time that he has spent there. He fears it will be impossible for him to win a disability claim from the VA, so I appreciate the time each one of you has dedicated to the men, women and their families who spent time at Camp Lejeune during those years, and I applaud your courage in continuing to fight for your rights and the rights of all those who really do need a voice, and I thank you for being that voice for so many.

Mr. Partain, you seem to have really got great information on this whole case. What is the incidence of breast cancer in the general public of men in our country?

Mr. PARTAIN. Well, according to SEER, which is the Surveillance Epidemiology and End Results, the occurrence of male breast cancer in the general population is generally one in 100,000. The average, the percent chance a male has of experiencing breast cancer in his lifetime from birth to age 85 is .01 percent, and the younger the man is at diagnosis, the rarer the cancer. Generally, male breast cancer is seen in men at age 70 or older.

Mrs. DAHLKEMPER. And of those who contract it at a younger age, do they normally have the marker, the genetic marker?

Mr. PARTAIN. Yeah, the BRCA markers are, like in women it is a significant marker for breast cancer risk. In men, a lot of the breast cancer in men are associated with the marker, and the absence of the markers does increase the rarity of the cancer.

Mrs. DAHLKEMPER. You don't know what those figures are, do you?

Mr. PARTAIN. I don't have them off the top of my head.

Mrs. DAHLKEMPER. Dr. Clapp, would you know that?

Dr. CLAPP. Not off the top of my head.

Mr. PARTAIN. I did have the genetic testing. The people told me there that without the markers, my chance would drop down to like .05 percent in the general population.

Mrs. DAHLKEMPER. I mean, I know it is very rare in the general public.

Mr. PARTAIN. Yes, the average is about 1,900 men per year are diagnosed with breast cancer out of a total of 235,000 people diagnosed with breast cancer annually.

Mrs. DAHLKEMPER. Thank you.

Dr. Clapp, in the two years that the Marine Corps knowingly allowed the Marines and their dependants to continue to drink that polluted water, do you have any how many Marines and their dependants would have been exposed to benzene, TCE or PCE?

Dr. CLAPP. I think the water modeling process that is going on right now would answer that question. It is not finished yet, especially the benzene part is still being worked on, so I don't think there is a way to answer that question quite yet.

Mrs. DAHLKEMPER. When will we have that information and how soon do they think they will have that?

Dr. CLAPP. I think the next panel will have that.

Mrs. DAHLKEMPER. Okay. I appreciate that. And so you already talked about some of the kinds of diseases that are associated with such exposures, and so you don't have any hard numbers on those diseases yet either?

Dr. CLAPP. That have occurred in Camp Lejeune veterans and families? Not yet.

Mrs. DAHLKEMPER. Okay.

Dr. Hargett, do you believe that the Marine Corps knew, that they understood when you came in front of them with your test results of the potential harm to human health of those that were being exposed?

Mr. HARGETT. That would be somewhat speculative on my part, but no, I don't think they had an awareness of the nature of the contaminant or its potential impact. I don't think I was dealing with utility personnel other than the base chemist that understood what a chlorinated solvent was. The priority for the base utility personnel is to make sure that, number one, the water was sanitary, and secondly, that there was an adequate supply in the line at all times. Those were the priorities for the operators. The chemical nature of the water was not a concern.

Mrs. DAHLKEMPER. So the woman that you had met with——

Mr. HARGETT. Ms. Betsy Betz.

Mrs. DAHLKEMPER. You don't believe that she understood?

Mr. HARGETT. She sought to understand. She asked many questions, and I gave her references, and indeed, she did her own research to determine what the impact of this contaminant was in the water, and I think she was genuinely concerned over the dependants and Marines that were consuming it.

Mrs. DAHLKEMPER. And then in the short meeting that you had that lasted less than five minutes, as you said, I think it was with—was it with a——

Mr. HARGETT. A Lieutenant Colonel.

Mrs. DAHLKEMPER. Were you able at all to talk about the effects of these chemicals?

Mr. HARGETT. No. Ms. Betz presented him a rather large stack of our reports and her own memos concerning the water and he simply put those to the side and then we were dismissed, but I did not have any opportunity to discuss the significance, and I had made some preparation to do so, but no, we did not have an opportunity to have a discussion about that water.

Mrs. DAHLKEMPER. Well, my time has expired, and I will yield back.

Chairman MILLER. Thank you.

We have been called to votes but we have some time to get there, so perhaps we can get a shortened second round of questions in, excuse this panel, then we need to go to votes, and then have the second panel when we return for votes.

Mr. Watters and Mr. Devereux, both of you have now had your claims honored but Mr. Partain is not a veteran. He is a dependant. Do you think it is fair that you are being compensated and Mr. Partain is not?

Mr. DEVEREUX. No, I absolutely do not. I think even in my statement, if I didn't publish, I apologize, but one of the things that I did agree on, not only was it just the Marines, the dependants, the civilians, I mean, he was really still part of the Marine Corps really. At Camp Lejeune, I mean, there were civilians also that I think should be under this, absolutely, no question about it.

Chairman MILLER. Mr. Watters?

Mr. WATTERS. I am very concerned about the dependants, about the folks who cannot file a claim with the VA. I am also very concerned about the civil service personnel. The base had a huge civil service population and those people, many of those people worked there for 20 or 30 years and they drank this water. You know, I don't even know what their status is but I think it would be unfair to not address their concerns and do something about their health issues.

Chairman MILLER. Mr. Hargett, one of the peculiar arguments is that the Marines did not act more quickly because they knew that the water was contaminated with PCE and TCE but didn't know the source of it and therefore they did not act because they didn't know the source. When I have seen a fire truck careening down the street with sirens going, I would assume that they were in a hurry to get to a fire to put it out, not to get to a fire to investigate the source of the fire. Does it make sense to you that they would not close the well when they knew that it was contaminated, even if they did not know the source?

Mr. HARGETT. Mr. Chairman, it was—this one particular well, the 602 well, was one of six or eight wells in the field. Now, this was a field of wells drawing water from a rather shallow aquifer. That contaminated area would have been influenced by a local source. It would have been very easy to simply shut that well down, and that was the recommendation that I gave Ms. Betz and the operator, to not use that well.

Chairman MILLER. Dr. Clapp, quickly on the same point.

Dr. CLAPP. I am sorry. The——

Chairman MILLER. Does it make sense not to close the well if you don't know the source of the contamination but you know that it is in fact contaminated at the levels that we now know what we knew then?

Dr. CLAPP. I think it makes no sense not to close such a well.

Chairman MILLER. Okay. Without knowing the source?

Dr. CLAPP. Correct.

Chairman MILLER. Okay. I will now recognize Dr. Broun for a shortened period of time.

Mr. BROUN. Thank you, Mr. Chairman.

Mr. Hargett, did you test water samples from other sites listed on the national priority list, and if so, how did the Department of Defense's response to the results you communicated differ from the response from other government entities facing similar situations at the time?

Mr. HARGETT. Most of our services for Safe Drinking Water Act compliance were for municipalities. Those municipalities were very concerned of any contamination of any kind that would show up in their water supply. If, for example, the city of Jacksonville adjacent to the base would find a well with anything, any contaminant, either chemical or biological, they would isolate that well and take it out of service until they knew what was going on in that well. We did not do additional priority pollutant analyses or additional screening. Our focus from the start was identifying the interference to our trihalomethane analysis. We wanted to know why we had trouble in getting an accurate quantification. So we focused on that area, the chlorinated solvents, because it interfered with our tests. We did not do additional survey work. It was discussed with Ms. Betz that additional evaluation was needed but we had no further activity in that area.

Mr. BROUN. Did you test any other wells besides those on Camp Lejeune, any in the general area?

Mr. HARGETT. We did the neighboring wells for the city of Jacksonville. We did analyses throughout eastern North Carolina for compliance. This was a regulatory requirement from the State of North Carolina that they define the level of trihalomethanes and report to the state those results.

By the way, there was some absence of reporting protocol from the base, and that was part of the reason that the water supply section was concerned. If we were doing the analyses, where were their quarterly reports?

Mr. BROUN. Did you find any contamination in other wells besides those specifically on the base that eventually were closed?

Mr. HARGETT. No.

Mr. BROUN. No other place?

Mr. HARGETT. No other water supply systems in that area did we find that contaminant.

Mr. BROUN. But you did extensive testing in areas other than at Camp Lejeune itself?

Mr. HARGETT. That is correct.

Mr. BROUN. Okay. I yield back, Mr. Chairman.

Chairman MILLER. Thank you.

Mrs. Dahlkemper is now recognized for two minutes.

Mrs. DAHLKEMPER. Thank you, Mr. Chairman.

Dr. Clapp, both Mr. Watters and Mr. Devereux, and I would say probably Mr. Partain might say the same thing, that if they had known of their exposure earlier, that they would have been more careful in monitoring their physical state for any kind of cancers that possibly could be caused by benzene, TCE and PCE. As it is, their cancers were identified late and they now are suffering the terrible consequences of that. The Navy only notified Lejeune veterans of problems with benzene, TCE and PCE in 2008 after Congress made them do it. If the Navy had acted earlier, say in the 1990s even, do you believe that it would have made a difference in the lives of not only those who are sitting here on this panel but maybe the lives of people who are no longer with us?

Dr. CLAPP. Yes, I do. I mean, I think it is sort of axiomatic that earlier diagnosis produces a better outcome. So if people had been notified, had gone to their physicians, gotten checked for, for example, kidney cancer or even male breast cancer, there would have been an earlier diagnosis of those tumors and less damage as a result.

Mrs. DAHLKEMPER. Can I just ask your opinion of this booklet?

Dr. CLAPP. I haven't had a chance to review it.

Mrs. DAHLKEMPER. You haven't had a chance to review it. Okay. I just was wondering.

Well, I know that our time is limited because we have to go vote, but the booklet claims that there is no scientific studies that have shown an association between pollutants in water and human health outcomes, and so is there no literature on the exposure to these chemicals?

Dr. CLAPP. There is lots of literature that I think I have referred to.

Mrs. DAHLKEMPER. Thank you very much, and I yield back.

Chairman MILLER. Thank you.

We now thank this panel, and they are excused, and when we return from votes, probably in perhaps half an hour, we will have the second panel. Thank you very much. We will be at ease.

[Recess.]

Panel II

Chairman MILLER. We will now begin with the second panel and—yeah, but I haven't introduced them yet. It is my pleasure to introduce our second panel. First is Major General Eugene G. Payne, Jr., the Assistant Deputy Commandant for Installations and Logistics for the Headquarters of the United States Marine Corps. Dr. Chris Portier is the new Director of the Agency for Toxic Substances and Disease Registry (ATSDR). I have asked that he be accompanied by Mr. Frank Bové of (ATSDR) who is familiar with these issues. Dr. Portier is new to this task, but Mr. Bové has worked on Camp Lejeune analysis for many years. And Mr. Thomas Pamperin is the Assistant Director under Secretary for Policy and Program Management of the Veterans Benefits Administration for the U.S. Department of Veterans Affairs.

As all of you should know by now you will have five minutes for your spoken testimony, your written testimony will be included in its entirety in the record for the hearing. And when you have completed your spoken testimony we will have questions from the members and each member will have five minutes to question the panel. It is the practice of this Subcommittee to take testimony under oath. Do any of you have any objection to taking an oath? Let the records reflect that none of the witnesses had any objection to taking an oath. You may also be represented by counsel. Do you have personal counsel here? And let the records reflect that all the witness said that they have no personal counsel here. If you will now please stand and Mr. Bové, if you could stand as well. Do you swear to tell the truth and nothing but the truth? Okay, the record should reflect that all the witnesses and Mr. Bové did take the oath. We will begin with General Payne. General Payne, you are recognized for five minutes.

STATEMENT OF MAJOR GENERAL EUGENE G. PAYNE, JR., ASSISTANT DEPUTY COMMANDANT FOR INSTALLATIONS AND LOGISTICS (FACILITIES), HEADQUARTERS, UNITED STATES MARINE CORPS

General PAYNE. Chairman Miller, Congressman Broun, Distinguished Members of this Subcommittee, thank you for the opportunity to appear before you and to participate in this hearing regarding past drinking water exposures at Marine Corps base Camp Lejeune. My name is Major General Grey Payne, and until recently I was the Assistant Deputy Commandant for Installations and Logistics for Facilities. I was responsible for Marine Corps facilities and services issues on our installations and bases to include environmental protection. I want to begin by saying that the welfare of our Marines, their family members, and our civilian employees is always of paramount importance to us as an organization and as individual leaders in the Department of the Navy. The Marine Corps is deeply concerned for any military or civilian families who are experiencing or have experienced health issues for any reason, and we understand that some believe their health conditions may have resulted from past exposure to the water at Camp Lejeune.

Beyond my duties as Assistant Deputy Commandant I also have a personal interest in this issue, as do many of us in the senior leadership of the Marine Corps. The Corps is and always has been a large family, and we all knew people who were stationed or worked at Camp Lejeune during their military careers. My first tour of duty was at Camp Lejeune in 1970. Many of my friends and most of the senior leadership of the Corps, both officers and enlisted were at Camp Lejeune during the period when this water was contaminated. We have a personal and professional interest in finding answers to questions about the health of our Marine families. The best way to provide those answers at the present time is for us to continue to support scientific studies that will improve our knowledge of the situation. The Department of the Navy has funded $22 million in such scientific efforts and we are committed to working closely with ATSDR and other scientific organizations in the quest for answers.

As for any issue that impacts the public, accurate dissemination of information is imperative. The Marine Corps takes this responsibility seriously and will continue to keep our Marine family informed of the scientific findings and reports regarding those studies. The Marine Corps continues to operate a call center, an internet based notification registry in conjunction with a robust radio, print, and internet advertising campaign that has resulted in over 163,000 individuals on our registry.

In closing, I want you to know that I have received and responded to many letters and have personally spoken with individuals who feel that they have been harmed by past Camp Lejeune water. Their situations are often sad and my heart goes out to them. The Marine Corps is committed to fully and properly utilizing the tools available to support our Marines, family members, and civilian employees. I look forward to answering your questions. Thank you.

[The prepared statement of General Payne follows:]

PREPARED STATEMENT OF EUGENE G. PAYNE, JR.

Representative Miller, Representative Broun, distinguished Members of the Subcommittee; thank you for the opportunity to appear before you and participate in this hearing regarding past drinking water exposures at Marine Corps Base Camp Lejeune. My name is Major General Gray Payne and until recently, I was the Assistant Deputy Commandant for Installations and Logistics for Facilities. I was responsible for Marine Corps facilities and services issues on our installations, to include environmental protection.

I want to begin by saying that the welfare of our Marines, their family members, and our civilian employees is always of paramount importance to us as an organization and as individual Department of the Navy leaders. The Marine Corps is deeply concerned for any military or civilian families who are experiencing or have experienced health issues for any reason and we understand that some may believe their health conditions resulted from past exposure to the water at Camp Lejeune.

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As with any issue that impacts the public, prompt and accurate dissemination of information is imperative. The Marine Corps takes this responsibility seriously and will continue to inform those who lived or worked at Camp Lejeune about any new developments. The Marine Corps operates a call center and internet-based notification registry to collect contact information from anyone who may have concerns about past water contamination at Camp Lejeune in order to provide current information to them. The Marine Corps is also continuing its robust outreach campaign including radio, print and internet advertising. Our efforts have resulted in over 163,000 individuals joining our notification registry.

In addition to our communications with the public, the Marine Corps will continue to support and cooperate with the independent organizations like the ATSDR, Department of Veteran's Affairs, and others in an effort to get answers for those of our Marine Corps family and keep them informed of our progress.

KNOWLEDGE OF PAST ENVIRONMENTAL CONTAMINATION

In 1981, Camp Lejeune officials became aware that volatile organic compounds (VOCs) were interfering with the analysis of potable water samples that were being collected in preparation for the implementation of future drinking water standards for Total Trihalomethanes (TTHM). Sampling conducted by a Navy contractor revealed that another chemical present in the water sample was interfering with the analysis; however, the specific type of chemical and source were unknown. Base personnel continued to sample the water for TTHMs over the next several years using various laboratories with varying results. Through targeted sampling in 1982 the Base detected that two of Camp Lejeune's eight public drinking water systems contained trichloroethylene (TCE) and perchloroethylene (PCE). TCE and PCE are chemicals commonly found in degreasing agents and dry cleaning solvents, respectively. It is important to note two key points. First, there were no drinking water regulations in place for TCE or PCE at the time of this discovery. Second, although the chemicals were identified in the drinking water systems, their origin remained unknown.

In the early 1980's, the Naval Assessment and Control of Installation Pollutants (NACIP) program, a predecessor of the current Department of the Navy (DON) Installation Restoration (cleanup) Program, was already in the process of identifying contaminated sites on Base for further sampling and investigation. Plans were in place to sample potable wells near the identified contaminated sites. It was this sampling that eventually identified, between late 1984 and early 1985, individual wells drawing groundwater containing TCE, PCE and other VOC's such as benzene. Base officials engaged in a concentrated effort to sample all wells on the installation as soon as they learned that the first well was impacted in late 1984. The Base completed this evaluation effort in 1985. If and when the Base officials received information that a well was contaminated, it was promptly removed from service.[1] Although the Base began its proactive responses in 1984, initial Safe Drinking Water Act regulation of these VOCs did not begin until three years later. Final regulations were not in force for TCE and benzene until 1989 and not until 1992 for PCE.

It is important to keep in mind that the events surrounding this situation occurred anywhere from 25 to over 50 years ago. Environmental standards and regulations have changed dramatically over the intervening years as a result of advances in scientific knowledge and increased awareness. The events at Camp Lejeune must be considered in light of the scientific knowledge, regulatory framework, and accepted practices that existed at the time, not in the context of today's standards.

NOTIFICATION

Camp Lejeune first notified military personnel and family members about the drinking water issue on December 13, 1984 through an article appearing in Camp Lejeune's newspaper, *The Globe*. Camp Lejeune also distributed a public notice to residents of Tarawa Terrace on April 30, 1985. In May 1985, Camp Lejeune issued a press release announcing the water contamination problem. In that press release the Base explained the steps planned to restore water services to the affected base residents. Following a May 1985 Camp Lejeune press event, the Jacksonville Daily News, Wilmington Morning Star, and Raleigh News and Observer printed several stories on the situation and further disseminated the information. These were just the early steps in what evolved into a 25 year public outreach campaign.

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[1] A separate investigation by the State of North Carolina in 1985 revealed leaks from an off-base dry cleaner had contaminated the wells near the Tarawa Terrace housing area. The Hadnot Point water system was contaminated by on-base sources.

From 2000 through 2001, the Marine Corps undertook an extensive outreach campaign in support of ATSDR's children's health survey – including press briefings and releases, messages to Marines world-wide, stories in base publications and websites, and a town hall meeting in Jacksonville, North Carolina. These efforts resulted in numerous stories in local and regional print and television news outlets across America. Because of the Marine Corps outreach efforts, ATSDR was able to obtain enough respondents to continue their current epidemiological study on birth defects and childhood cancers.

Congress later became interested in the public outreach program, resulting in the FY08 National Defense Authorization Act mandate that the Secretary of the Navy attempt to directly notify former residents of Camp Lejeune of their potential exposure to the chemicals. The Act also required that ATSDR develop a health survey to be included with the notification letter. On September 14, 2007, the Marine Corps posted a link to the registration database on its website (*www.marines.mil/clsurvey*) to provide easy access for former Camp Lejeune residents and workers, as well as other interested parties, to register to receive updates on the ongoing studies or information about other new developments on this important issue. The Marine Corps also created an enhanced call center, which became operational on September 17, 2007, to allow people to register by phone. Each new registrant receives a welcome packet that includes information about the issue and points of contact for additional information.

The Marine Corps continues to encourage former base residents and workers to register through general notification efforts. These general notifications include articles and/or advertisements in newspapers such as USA Today; periodicals such as Time, Newsweek, Sports Illustrated, and Good Housekeeping; internet advertisements on general consumer websites such as WebMD, Weather.com, and NFL.com; military related websites such as the Leatherneck, U.S. Navy Institute, and the Vietnam Veterans Association; internet search engines such as Yahoo and Google; and radio broadcasts. In addition, the Marine Corps sendt posters to Veterans of Foreign Wars District Offices, Veterans' Centers, commissaries, and Veteran's Affairs treatment centers across the country. To date, more than 163,000 individuals are on the registry. We receive new registrations each week, and we continue our pro-active outreach efforts.

COORDINATION WITH DEPARTMENT OF VETERANS AFFAIRS

As part of the Marine Corp's robust outreach and notification campaign we have worked extensively with various Veterans Affairs (VA) offices. In 2007 and 2008 we sent notification and registry posters to over 200 VA centers in all 50 states as well as the US Territories and Washington, DC. We also sent copies of posters in 2007 and 2008 to Veterans of Foreign Wars District Offices and Military Treatment Facilities. In March 2009, we worked with VA public affairs personnel to prepare an email to alert VA program directors and other executives of new information about the water contamination; in particular, the pending release of the National Research Council report regarding Camp Lejeune Water. The email established a direct communication mechanism for VA personnel to contact Headquarters Marine Corps for additional information and assistance. We currently provide periodic updates of our notification registry information to the VA to enable them to assist us in our outreach activities.

SUPPORT OF ATSDR HEALTH INITIATIVES

All military installations on the National Priorities List of hazardous waste sites, including Camp Lejeune which was listed in 1989, undergo a Public Health Assessment (PHA) conducted by the ATSDR to determine if there are any current or past health concerns resulting from past practices.

ATSDR first visited Camp Lejeune in 1991. Beginning with this trip, Camp Lejeune provided information to ATSDR as part of the development of the PHA; the Marine Corps continues to provide ATSDR open access to any potentially relevant data in our possession today. As a result of the PHA, the ATSDR recommended an epidemiological study of former Camp Lejeune residents to determine what effect, if any, the VOCs may have had on the health of children exposed prenatally, a population ATSDR considered to be the most susceptible to health impacts from VOCs. In support of this recommendation, a health survey was conducted in 1999 to identify children with certain health conditions who might be included in a case control study.

In 2000, ATSDR requested assistance from the Marine Corps to reach additional participants for the health survey started in 1999. At the time, ATSDR had approximately 6,500 participants and they needed more for a statistically valid study. The

Marine Corps helped ATSDR identify participants eligible for the survey through targeted and global notifications. For example, in January 2000, Camp Lejeune held an "open house" with base residents and the Jacksonville community to discuss issues about the drinking water previously discovered to contain VOCs. In August 2000, Headquarters Marine Corps sent a message to all Marines worldwide in an effort to reach potential ATSDR survey participants. The Marine Corps published articles in numerous base newspapers including the Quantico Sentry, Camp Lejeune Globe, and Camp Pendleton Scout. Camp Lejeune sent a press release to other military base publications. In November 2000, Headquarters Marine Corps held a press briefing at the Pentagon asking media to assist in helping to reach potential survey participants. On January 25, 2001, Headquarters Marine Corps sent a second message to all Marines worldwide in an effort to reach potential ATSDR survey participants. In February 2001, the Marine Corps began regional media outreach efforts, and reached the following outlets:

(A) TV Stations—1027 outlets
(B) Daily Newspapers—1373 outlets
(C) Weekly Newspapers—1171 outlets
Total: 3571 media outlets contacted.

In order to support the ATSDR survey, in 2001, Headquarters Marine Corps obtained approval from the Department of Defense for a limited release of Social Security Number information covered by the Privacy Act to the ATSDR. Headquarters Marine Corps conducted extensive data searches for contact information to help ATSDR locate potential survey participants.

Partly as a result of these efforts, ATSDR closed their survey in January 2002 with 12,598 participants; enough to go forward with their current epidemiological study on birth defects and childhood cancers.

In July 2003, the ATSDR released a progress report of the survey and concluded that a follow-on case control/epidemiological study was warranted. The Marine Corps actively participated in publicizing this report through a press release, a webcast by the Deputy Commandant for Installations and Logistics, and by posting survey information on the Marine Corps Camp Lejeune drinking water webpage. ATSDR also determined in 2003 that extensive water modeling would be needed at Camp Lejeune in support of the case control study. That water modeling continues today and is currently projected to be complete in mid to late 2011. The case control study will be completed sometime thereafter.

In July 2005, in an effort to fully identify the universe of information related to the historic drinking water issue at Marine Corps Base Camp Lejeune (MCBCL), Headquarters Marine Corps (HQMC) contracted to provide a comprehensive, transparent document search and collection effort covering Camp Lejeune areas and facilities. The contractor conducted a preliminary assessment and on 7 November 2005, invited ATSDR to attend its kick-off brief for the base-wide document search. ATSDR staff made comments that the Marine Corps integrated into search parameters. In December of 2005, the Marine Corps provided ATSDR a copy of the "Camp Lejeune Water" (CLW) database on CD per ATSDR request.

From February through July 2006, the contractor conducted an exhaustive search of MCBCL and its facilities. The Marine Corps intended to systematically identify and inventory pre-1988 documents pertinent or useful to analyzing the water issue at MCB Camp Lejeune. The search encompassed the contents of 718 buildings and resulted in locating 8,599 documents (390,782 PDF pages). In July 2006, ATSDR followed up this search with another visit to MCBCL to review more documents.

From February 2008 through March 2009, the contractor converted documents into electronic formats by scanning, indexing, and image-preserving, as part of the on-going records management initiatives in direct support of the document repository. In November 2008, ATSDR made another site visit to review collected documents. In early 2009, the Marine Corps provided ATSDR with user name and password access to hundreds of MCBCL environmental documents via a controlled internet gateway in order to facilitate ATSDR's receipt of information. Furthermore, ATSDR was provided with a full document repository index prior to another visit on 26–27 May 2009. ATSDR used this index to identify documents they wanted to review for further evaluation. ATSDR reviewed the documents while at Camp Lejeune and the Marine Corps again provided copies of requested documents.

In June 2010, the Department of the Navy and ATSDR established a Data Mining Technical Workgroup to complete the identification, review, and exchange of documents, data, and information needed for ATSDR's studies. Both agencies felt that the most effective way for ATSDR to continue with its studies was to establish this Workgroup that will closely review all repositories of available data and information in order to identify any additional data and information that may be of value to ATSDR's health initiatives at Camp Lejeune. The Workgroup's efforts serve to formalize the existing shared commitment to complete the data mining activities to completion. The Workgroup has convened three times and has made significant progress to complete its goals.

INDEPENDENT REVIEWS AND INVESTIGATIONS

Three independent reviews have been conducted of the actions taken by Marine Corps personnel on this matter: an independent Fact-Finding Panel chartered by the Commandant of the Marine Corps, an EPA Criminal Investigation Division (CID) investigation, and a Government Accountability Office (GAO) review.

In 2004 the Fact-Finding Panel determined, among other things, that Camp Lejeune provided drinking water at a level of quality consistent with general water industry practices in light of the evolving regulatory requirements at the time.

Among the EPA CID's 2005 conclusions was a determination that there had been no violations of the Safe Drinking Water Act, no conspiracy to withhold information, falsify data, or conceal evidence.

In 2007 the GAO issued a report reviewing the Camp Lejeune drinking water factual history and technical aspects of ATSDR study. The report had no findings or recommendations for the Marine Corps.

In accordance with the 2007 National Defense Authorization Act, the Marine Corps contracted with the National Academies' National Research Council (NRC) to review the evidence regarding potential associations between exposure to contaminated drinking water at Camp Lejeune and adverse health effects in prenatal children, children, and adults. The NRC review report concluded that while former Camp Lejeune residents and workers were exposed to unregulated solvents, the committee did not find sufficient evidence to justify causal inference for any health effects it reviewed. The report also noted that the exposures required to cause adverse effects in laboratory animals were much larger than the highest measurements available on the Camp Lejeune water supplies; evidence that humans have lower sensitivity to TCE and PCE than rodents; epidemiological data largely from occupational settings with higher, longer-term exposures to TCE and PCE that has not generated compelling evidence of adverse health effects; and the relatively short-term intermittent nature of the exposures incurred at Camp Lejeune. The review concluded, however, that adverse health effects could not be ruled out and that the DON (and other policy makers) should move forward with responses they deem appropriate based on available information.

CONCLUSION

As I mentioned above at the beginning of my testimony, the welfare of our Marines, their family members, and our civilian employees is of paramount importance I have received many letters and have personally spoken with individuals who feel that they have been harmed by Camp Lejeune water. Their situations are often sad, and my heart goes out to them. The Marine Corps is committed to fully and properly utilizing the tools available to support our Marines and family members. However, under current law the Department of the Navy cannot provide compensation for claims for illness, disease, or injury without a demonstration of causation and we do not have that at this time. Currently, scientific studies haven't determined reliably whether diseases and disorders experienced by former residents and workers at Camp Lejeune are associated with their exposure to contaminants in the water supply because of data shortcomings and methodological limitations. We assure you that we will continue maximum efforts to take appropriate actions for our Marines, their family members, and civilian employees.

BIOGRAPHY FOR EUGENE G. PAYNE, JR.

Major General Payne currently serves as Assistant Deputy Commandant for Installations and Logistics (Facilities), Headquarters, United States Marine Corps.

A graduate of North Carolina State University, Major General Payne entered the Marine Corps in 1970 as a recruit at Parris Island, SC. On January 1, 1976 he was promoted from Staff Sergeant to Second Lieutenant and received an Infantry Officer MOS.

His nine command tours include three companies: Truck Company, 6th Motor Transport Battalion, Orlando, FL (October 1985 to May 1988); Company C, 4th Landing Support Battalion, Charleston, SC (October 1989 to August 1990); and H&S Company, 2d Marine Expeditionary Brigade, Camp Lejeune, NC (September 1990 to July 1992). From October 1993 to October 1995 he served as Commanding Officer, 4th Landing Support Battalion, 4th FSSG, Seattle, WA. During this two-year tour, the Battalion won five major awards for excellence, including two Cates Awards, two Hanson Awards, and the Schmidt Award. Major General Payne served as Commanding Officer, 4th FSSG Forward (East), Camp Lejeune, NC, from March 1999 to March 2001, as Deputy Commander, 4th FSSG, New Orleans, LA from June 2001 to September 2002, Commanding General, Marine Corps Mobilization Command, Kansas City, MO from May 2003 to November 2004, as Commanding General, Marine Corps Logistics Command, Albany, GA from November 2004 to July 2005, and Commanding General 4th Marine Logistics Group, New Orleans, LA from July 2005 to August 2007.

Major General Payne's staff billets include Operations Officer, 2d BTO, Savannah, GA; G–4 Ops and Deputy G–4, 2d MEB, Camp Lejeune, NC; G–3 Plans, Deputy G–3, and Assistant Chief of Staff G–3, 4th FSSG, New Orleans, LA; Assistant Chief of Staff G–3, Marine Forces Korea; Assistant Chief of Staff G–4, II MEF, Camp Lejeune, NC; Chief of Staff, Marine Corps Reserve Support Command, Kansas City, MO; and Director of the CENTCOM Deployment and Distribution Operations Center, Kuwait.

During his service in the Marine Corps Reserve, Major General Payne has completed numerous schools, including Amphibious Warfare School, Command and Staff College, Landing Force Staff Planning, LOGTECH, and the U. S. Army War College, where he was awarded a Masters Degree in Strategic Studies. He is President of the Marine Corps Reserve Policy Board and currently serves on the MCA Board of Governors. His personal awards include the Defense Superior Service Medal, Legion of Merit Medal, Meritorious Service Medal with two gold stars, and the Navy and Marine Corps Commendation Medal with gold star.

Chairman MILLER. Thank you, General Payne. Dr. Portier. Dr. Portier, I should note that you are new to this job and this Subcommittee, and I have been very critical of ATSDR in the past. And I appreciate your coming to meet with me, and you do come well recommended by people I know at NIEHS and NIH and certainly hope that the ATSDR performs at least—perform an important function. And there are many very dedicated professionals there who want—who believe in the mission of ATSDR and want to do better in the future. So I welcome you to your new role.

STATEMENT OF CHRIS PORTIER, DIRECTOR, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR)

Dr. PORTIER. Thank you, Mr. Chairman, and I believe in that mission as well. Good morning Chairman Miller, Ranking Member Broun, and other Distinguished Members of this Subcommittee. On behalf of the CDC Director, ATSDR Administrator Dr. Thomas Friedan, I thank you for the opportunity to be here today. I am Dr. Christopher Portier, Director of the Agency for Toxic Substances and Disease Registry and Centers for Disease Control and Preventions National Center for Environmental Health; a position I have held since August of this year. Prior to that I served for 30—for over 30 years at the NIEHS. I am accompanied today by Dr. Frank Bové from our Division of Health Studies. As I approach my new position at ATSDR I am keenly aware of the agency's important role in providing public health assistance and expertise to people and communities affected by hazardous substances. And I am committed to continuing the critical work of the agency at Camp Lejeune.

In my testimony I will discuss ATSDR's involvement at Camp Lejeune. First, I will provide background on our health assessments and on the primary drinking water contaminants at Camp Lejeune. I will then address ongoing agency activities related to the base focusing on the community assistance panel, water modeling and health studies.

In 1989, EPA placed U.S. Marine Corps base Camp Lejeune and ABC One Hour Cleaners, which is located very close to the base, on its National Priorities List of hazardous waste sites. Shortly thereafter in August of 1990, ATSDR completed a PHA, a public health assessment, addressing contamination from the ABC One Hour Cleaners. This assessment found that tetrachloroethylene—or PCE—was in the Tarawa Terrace water system and its supply wells. In 1997, ATSDR completed a PHA addressing all of Camp Lejeune. ATSDR's investigation at Camp Lejeune identified potential exposures to drinking water contaminated with benzene, trichloroethylene, known as TCE, PCE, and their degradation products in a number of those. Long term exposure to benzene has effects on the bone marrow and can cause anemia and leukemia. The National Toxicology Program Report on Carcinogens recognizes benzene as a known human carcinogen. The NTP lists trichloroethylene as reasonably anticipated to be a human carcinogen based on limited evidence of carcinogenicity from studies in humans and sufficient evidence of carcinogenicity from studies in experimental animals. The NTP lists PCE as reasonably anticipated to be a human carcinogen based on sufficient evidence of carcinogenicity in experimental animals. In the 13 years since the 1997 PHA was published, ATSDR, with help from ATSDR's Camp Lejeune Community Assistance Panel and others, has located additional information on VOC's in drinking water at Camp Lejeune, based in part on information obtained through ATSDR's ongoing water modeling and exposure reconstruction study. We have determined that persons in housing served by the Holcomb Boulevard system were exposed to contaminated drinking water for a longer period than we suspected in 1997, suggesting the possibility of increased risks. Further, recently discovered information indicates that benzene contamination at Hadnot Point was greater than what was assumed in 1997. ATSDR removed the PHA from its website in 2009, and we plan to reassess the drinking water pathway and revise the PHA when water modeling analyses are completed. It is becoming increasingly clear that information available in 1994 suggests to me greater emphasis should have been placed on benzene.

In 2005, ATSDR established a Community Assistance Panel or CAP to facilitate the direct participation of the affected community in our Camp Lejeune related health activities. The CAP consists of seven community members. Also participating in CAP meetings are one representative from the Department of Defense, two independent scientific experts, and the ATSDR staff. The CAP has been instrumental in helping ATSDR by providing information vital both to the water modeling effort and to the design and implementation of the epidemiological studies. Water modeling is a key component of ATSDR's ongoing studies at Camp Lejeune, because only limited measurements of contaminant concentrations are available. ATSDR is using complex modeling techniques to reconstruct historical conditions of ground water flow, contaminant fate and transport, and the distribution of drinking water contaminated with VOC's delivered to family housing areas.

Because of the vast amount of data and the historical nature of the information, it has been extremely difficult for ATSDR to obtain relevant information needed to complete its work at Camp Lejeune. While ATSDR has been provided with much information and given access to a large amount of information in the past, several new sources of critical and relevant information have recently been identified and relevant documents exist in several large storage systems in catalogues maintained by the Navy. ATSDR and the Department of Navy established a Camp Lejeune data mining technical work group in June 2010. The goal of this joint agency work group is to identify and inventory relevant information and data.

I will quickly summarize: in addition to the data mining and modeling exercise we are doing four different epidemiological studies, and redoing one that we did earlier. Those studies depend upon that water modeling in order that we can address what individuals were exposed to, for how long, and to what contaminants, and use that in deciding if there is a relationship between the exposures and the diseases we will be looking at.

I want to thank you very much for the opportunity to be here today and that ends my presentation.

[The prepared statement of Dr. Portier follows:]

PREPARED STATEMENT OF CHRISTOPHER PORTIER

Good morning Chairman Miller, Ranking Member Broun, and other distinguished Members of the Subcommittee. On behalf of CDC Director/ATSDR Administrator Dr. Thomas Frieden, I thank you for the opportunity to be here today.

I am Dr. Christopher Portier, Director of the Agency for Toxic Substances and Disease Registry (ATSDR) and the Centers for Disease Control and Prevention's (CDC's) National Center for Environmental Health (NCEH), a position I have held since August of this year. I came to CDC from another agency in the Department of Health and Human Services, the National Institute of Environmental Health Sciences (NIEHS) at the National Institutes of Health (NIH). At NIEHS, I served most recently as the Senior Advisor to the Director and as a Principal Investigator in environmental systems biology. Prior to my time in that role, I served as Associate Director of NIEHS, Director of the Environmental Toxicology Program, and as Associate Director of the National Toxicology Program.

ATSDR has a unique mandate to conduct human health studies and research related to community exposures to hazardous substances. Although knowledge of the relationships between chemical exposures and human health is often based upon studies of highly exposed workers or animal toxicology testing, there remains a pressing need to know whether lower level exposures and exposures away from the workplace can cause human illness. Drinking water contamination at Camp Lejeune was identified as a circumstance that would benefit from this type of investigation. As I approach my new position at ATSDR, I am keenly aware of the Agency's important role in providing public health assistance and expertise to people and communities impacted by hazardous substances. And, I am committed to continuing the critical work of the Agency at Camp Lejeune.

In my testimony I will discuss ATSDR's involvement at Camp Lejeune. First I will provide background on our health assessments and on the primary drinking water contaminants at Camp Lejeune. I will then address ongoing Agency activities related to the base, focusing on the Community Assistance Panel, water modeling, and health studies.

Background:

In 1989, the Environmental Protection Agency (EPA) placed U.S. Marine Corps Base Camp Lejeune and ABC One-Hour Cleaners, which is located very close to the base, on its National Priorities List of hazardous waste sites. Information that EPA had at the time indicated that releases of chemicals from both the cleaners and activities at Camp Lejeune contributed to contamination of two of the water supply systems serving certain areas of base housing.

ATSDR Public Health Assessments:

In August 1990, ATSDR completed a Public Health Assessment (PHA) addressing contamination from the ABC One-Hour Cleaners. This assessment found that tetrachloroethylene—also known as perchloroethylene or PCE—was in the Tarawa Terrace water system and its supply wells. This raised ATSDR's concerns regarding the health of persons who consumed this water over extended periods, leading the Agency to conduct a more thorough evaluation of the contamination.

In 1997, ATSDR completed a PHA addressing environmental contamination at Camp Lejeune. In this PHA, ATSDR concluded that past exposures in three drinking water systems on base to certain chemicals, including benzene and two common groundwater contaminants, trichloroethylene (TCE) and PCE, and their degradation products, posed a public health hazard. However, because of the limitations of the available scientific data relating to the harmful effects of these chemicals, the PHA recommended conducting an epidemiological study to assess risk to infants and children from potential maternal exposure during pregnancy to the VOC-contaminated drinking water.

In the 13 years since the 1997 PHA was published, ATSDR, with help from ATSDR's Camp Lejeune Community Assistance Panel (CAP) and others, has located additional information on VOCs in drinking water at Camp Lejeune. Based in part on information obtained through ATSDR's ongoing extensive water modeling and exposure reconstruction study, we have determined that persons in housing serviced by a third water distribution system, referred to as the Holcomb Boulevard system, were exposed to contaminated drinking water for a longer period than we knew in 1997, suggesting the possibility of increased risks. Further, recently discovered information indicates that benzene contamination at Hadnot Point was greater than what was known in 1997. ATSDR removed the PHA from its website in 2009 and plans to reassess the drinking water pathway and revise the PHA when water modeling analyses are completed.

Primary Contaminants

Benzene is a widely used chemical formed from both natural processes and human activities. Long-term benzene exposure has effects on the bone marrow and can cause anemia and leukemia. The National Toxicology Program (NTP) Report on Carcinogens has recognized benzene as a known carcinogen.

TCE is a colorless liquid which is used as a solvent for cleaning metal parts. The NTP Report on Carcinogens classifies TCE as reasonably anticipated to be a human carcinogen based on limited evidence of carcinogenicity from studies in humans and sufficient evidence of carcinogenicity from studies in experimental animals. Most available information comes from animal studies or studies of workers who use these chemicals in the workplace. Very few studies have been conducted of people exposed to low levels of these chemicals in their drinking water. A meta-analysis of seven cohort studies found that occupational exposure to TCE was associated with excess incidences of liver cancer, kidney cancer, non-Hodgkin's lymphoma, prostate cancer, and multiple myeloma, with the strongest evidence for the first three cancers (Wartenberg *et al*. 2000).

PCE is a manufactured chemical used for dry cleaning and metal degreasing. The NTP lists PCE as reasonably anticipated to be a human carcinogen, based on sufficient evidence of carcinogenicity in experimental animals. According to the NTP's 11th Report on Carcinogens, there is limited evidence for the carcinogenicity of PCE in humans.

Community Assistance Panel

Based on recommendations from a scientific panel convened by ATSDR in 2005, ATSDR established a Community Assistance Panel—or CAP—to facilitate the direct participation of the affected community in our Camp Lejeune-related health activities. The original purpose of the CAP was to voice the concerns of the affected community of Marines and their families and to provide input for future health studies. In its January 2010 meeting, the OAP's mission was articulated as: "To represent the interests, consequences, and quality of life of those impacted by exposure to toxic substances at Camp Lejeune. ATSDR will look at the potential for future studies at Camp Lejeune with the full inclusion of the community members affected." The CAP does not provide consensus advice to ATSDR in carrying out agency programs and activities, nor do CAP members speak for or represent ATSDR. The CAP consists of seven community members. Also participating in CAP meetings are one representative from the Department of Defense (DOD), two independent scientific experts, and ATSDR staff. Members of the CAP provide individual input, as well as represent the views of the community and groups to which they belong. Meetings are held quarterly and are open to the public.

The CAP has been instrumental in helping ATSDR by providing information vital both to the water modeling effort and to the design and implementation of the epidemiological studies. The CAP has reviewed archived data, disseminated information about historical drinking water contamination at the base, advised other members of the affected community on how to apply for benefits from the Department of Veterans Affairs (VA), and represented the affected community's health concerns in discussions with VA administrators.

Water Modeling

Water modeling is a key component of ATSDR's ongoing studies at Camp Lejeune. Because only limited measurements of contaminant concentrations are available, ATSDR is using complex modeling techniques to reconstruct historical conditions of groundwater flow, contaminant fate and transport, and the distribution of drinking water contaminated with VOCs delivered to family housing areas.

Prior to the end of 1987, two of the water systems at Camp Lejeune were continuously contaminated, and one water system, Holcomb Boulevard, was intermittently contaminated with VOCs. This contamination changed in concentration over time depending on the source wells and other factors. Using water modeling ATSDR will estimate exposures for each housing area.

These models are being used to characterize historical contamination sources and predict drinking water concentrations of PCE (and its degradation by-products of TCE, 1,2-DCE, and vinyl chloride), TCE (and its degradation by-products of 1,2 DCE and vinyl chloride), and benzene. ATSDR published Tarawa Terrace reconstructed drinking water results during 2007–2009.

ATSDR–Department of the Navy Camp Lejeune Data Mining Technical Workgroup. Because of the vast amount of data and the historical nature of the information, it has been extremely difficult for ATSDR to obtain relevant information needed to complete its work at Camp Lejeune. While ATSDR has been provided with much information and access to a large amount of information in the past, several new sources of critical and relevant information have recently been identified, and relevant documents exist in several large storage systems and catalogs maintained by the Navy. To make sure that relevant information is located, ATSDR and the Department of the Navy established a Camp Lejeune Data Mining Technical Workgroup in June 2010. The goal of this joint-agency workgroup is to identify and inventory relevant information and data. These data are necessary to complete current water modeling activities and other Camp Lejeune health activities. The work of the group is ongoing, and the group is planning to complete its major activities in the fall of 2010.

Completion of Water Modeling. Modeling of reconstructed drinking water concentrations for Hadnot Point and Holcomb Boulevard began in June 2007. Predictions from the modeling are expected to be available to ATSDR scientists conducting the epidemiological studies within a year, with publication of the water modeling results anticipated by the spring of 2012.

Health Studies

Adverse Pregnancy Outcomes Reanalysis. In 1995, ATSDR began a study of adverse pregnancy outcomes at Camp Lejeune in relation to exposure to VOCs in drinking water. ATSDR found statistically significant associations for some subgroups (older mothers and mothers with histories of fetal loss) living in homes in Tarawa Terrace (PCE), and elevated risks of small for gestational age (SGA) births and low birth weights.

Later information indicated that some women, who were considered not to be exposed because they were served by the Holcomb Boulevard system, were potentially exposed during pregnancy. ATSDR and the Department of Navy are engaged in intensive efforts to identify information needed for water modeling. ATSDR will conduct a new evaluation of adverse pregnancy outcomes when the modeled water concentrations are available.

Case-Control Study of Specific Birth Defects and Childhood Cancers. ATSDR identified children born during 1968–1985 to mothers who were exposed to VOC-contaminated drinking water at Camp Lejeune at any time during their pregnancy. Cases of neural tube defects (i.e., spina bifida and anencephaly), cleft lip, cleft palate, leukemia or non-Hodgkin's lymphoma were identified during a telephone survey conducted during 1999–2002, and have been confirmed by medical records. The parents of confirmed cases and a random sample of controls (i.e., children who did not have birth defects or childhood cancers) were interviewed in 2005. Analyses of this data will be conducted once the results of the water modeling become available.

Scientific Panel

In February 2005, ATSDR convened a scientific panel composed of scientists from government and academia with expertise in epidemiology and public health, biostatistics, drinking water contaminants, pesticides, toxicology, reproductive health, and environmental health. The panel was asked to provide advice on whether additional epidemiological studies on the health effects of exposures to contaminated water at Camp Lejeune should be conducted. ATSDR convened this panel in response to concerns that ATSDR's studies of adverse birth outcomes and childhood cancers were too narrowly focused, and may have missed adult cancers and non-cancer diseases among children and adults. As this panel was not a federal advisory committee, panel members were asked to provide their individual opinions. ATSDR accepted panel recommendations to assess the feasibility of conducting a mortality study and a cancer incidence study. ATSDR subsequently concluded that a mortality study and a cancer incidence study are feasible.

Mortality Study of Former Marines and Civilian Employees. This study will look at all causes of death, including cancers and other fatal diseases. All active duty Marines stationed on base at any time between June 1975 and September 1987 who began active duty service on or after June 1975 have been identified. In addition, all civilians employed at the base at any time between June 1974 and September 1987 who began U.S. Department of Defense employment on or after June 1974 have been identified. These cohorts will be compared to cohorts of active duty Marines and civilian employees from Camp Pendleton who were not stationed at Camp Lejeune during the period of drinking water contamination. The study is designed to identify significant changes in causes of death between the Camp Lejeune cohort and the Camp Pendleton cohort.

Health Survey/Morbidity Study. The 2008 National Defense Authorization Act requires development of a health survey of persons possibly exposed to contaminated drinking water at Camp Lejeune. The survey will obtain information about cancers and other diseases thought to be related to exposures to the chemicals found in the drinking water at Camp Lejeune. The morbidity study will focus on those who were: active duty Marines stationed on base at any time between June 1975 and September 1987; civilians employed at the base at any time from December 1972 to September 1987; comparison cohorts of active duty Marines and civilian employees from Camp Pendleton who were not stationed at Camp Lejeune during the period of drinking water contamination; and active duty Marines and their dependents (spouses and children who are now all adults) who participated in the 1999–2002 survey to identify cases for the case-control study of specific birth defects and childhood cancers. Those who registered with the U.S. Marine Corps (USMC), but who are not members of these cohorts, will be sent a survey but will not be included in the morbidity study.

Conclusion

ATSDR has an essential role in providing public health support to people and communities impacted by hazardous substances. Our goal is to provide objective, scientific information to all who lived and worked at Camp Lejeune who want to know about the health risks from past exposures.

Much of our remaining work at Camp Lejeune depends on the data and analyses that will come from our water modeling effort. The state-of-the-art analysis, which predicts drinking water concentrations, will provide us with the best possible exposure estimate.

However, the quality of the information produced by the water modeling effort is heavily dependent on beginning with the most accurate and complete data. The ATSDR /Department of the Navy joint Data Mining Technical Work Group was developed to provide high-level guidance in an intensive effort to identify and review Navy and Marine Corps documents, and to insure that any and all existing pertinent data is available to ATSDR's engineers and scientists.

ATSDR serves the men and women—and their families—who lived and worked at Camp Lejeune while the drinking water was contaminated. As an Agency, we are honored to have the trust and support of former Marines, their family members, and the civilian employees of Camp Lejeune. Our work at Camp Lejeune and many other sites would not be possible without the support and partnership of multiple people and organizations.

Thank you once again for this opportunity to testify before the Subcommittee.

BIOGRAPHY FOR CHRISTOPHER PORTIER

Christopher J. Portier, PhD, joined CDC in 2010 as the Director of the National Center for Environmental Health and Agency for Toxic Substances and Disease Registry. Dr. Portier came to CDC from the National Institute of Environmental Health Sciences (NIEHS), where he was the Senior Advisor to the Director and a Principal Investigator in environmental systems biology. Formerly, Dr. Portier was Associate Director of NIEHS, Director of the Environmental Toxicology Program at the NIEHS, and Associate Director of the National Toxicology Program.

Dr. Portier is an internationally recognized expert in the design, analysis, and interpretation of environmental health data. His research efforts and interests include such diverse topics as cancer biology, risk assessment, climate change, bioinformatics, immunology, neurodevelopment, genetically modified foods, and genomics. From 2000 to 2006, he managed the NTP and developed a strategic initiative that is internationally recognized for its innovation. He has contributed to the development of cancer risk assessment guidelines for national and international agencies and has either directed or contributed significantly to numerous risk assessments. He led the U.S. evaluation of electromagnetic fields by national and international scientists, which was the first comprehensive review in this field. Dr.

Portier directed efforts of the U.S. government to develop a collaborative research agenda with Vietnam on the health effects of Agent Orange in that country. He has just directed a multiagency review of research needs for the health effects of climate change for the entire U.S. government. He has served as an advisor to the Finnish Academy of Sciences on the Centers of Excellence Research Program, as a member of World Health Organization/International Agency for Research on Cancer scientific committees, and as a reviewer for grants for the United States, the European Union, and many other grant-sponsoring organizations.

Dr. Portier received his B.Sc. degree (1977) in mathematics (summa cum laude) and his MS (1979) and PhD (1981) degrees in biostatistics. He has authored more than 150 peer-reviewed publications, 30 book chapters, and 40 technical reports. In the past 5 years, he has given more than 70 invited lectures, many of them at international meetings.

He has received numerous awards including the prestigious Spiegelman Award from the American Public Health Association and the Outstanding Practitioner of the Year Award from the International Society for Risk Analysis. He is a Fellow of the International Statistics Institute, the World Innovation Foundation, and the American Statistical Association.

Chairman MILLER. Thank you, Dr. Portier. Mr. Pamperin, you are recognized for five minutes.

STATEMENT OF THOMAS J. PAMPERIN, ASSOCIATE DEPUTY UNDER SECRETARY FOR POLICY AND PROGRAM MANAGEMENT, VETERANS BENEFITS ADMINISTRATION, U.S. DEPARTMENT OF VETERANS AFFAIRS

Mr. PAMPERIN. Thank you. Chairman Miller, Ranking Member Broun, and Members of the Subcommittee thanks for the opportunity to discuss the efforts undertaken by the Department of Veterans Affairs regarding water contamination at Camp Lejeune Marine Corps Base in North Carolina, and to explain the disability compensation process for potentially affected veterans.

A 2007 final report of the Veterans Disability Benefits Commission, a congressionally mandated independent review board raised general awareness at VA of the potential water contamination at Camp Lejeune. The report indicated that the Agency for Toxic Substances and Disease Registry and the Department of Health and Human Services had conducted an environmental assessment of Camp Lejeune during 1997 which found that from the '50s to the mid-'80s persons residing or working at Camp Lejeune were potentially exposed to drinking water supplies contaminated with volatile organic compounds from an off base dry cleaning facility. Subsequent investigations also found evidence of benzene in the same water supplies presumably caused by leaking fuel storage tanks. In 2009, the National Academy of Sciences National Research Council released a study titled "Contaminated Water Supplies at Camp Lejeune" assessing potential health effects. Currently additional studies on the contaminated water parameters of likely exposures and potential adverse health effects are being conducted by ATSDR.

In response to the NCR's study, VA assembled a task force to determine whether the NCR report provided sufficient scientific basis for determining whether the population at Camp Lejeune had in fact suffered adverse health effects as a result of exposure to contaminants in the water supply. The task force is continuing to work and will submit its findings to the Secretary for consideration.

In keeping with our mission, VA stands ready to provide treatment and compensation for any veteran whose current disability is the result of service at Camp Lejeune. My testimony outlines VA's disability claims process including the issue of presumptive disabilities, and addresses the specific situation at Camp Lejeune. VA provides compensation payments to veterans with current disability conditions that were caused or aggravated by an event, injury or disease that occurred during military service. These conditions are referred to as service-connected disabilities. There is more than one way of obtaining a service-connected disability. The most common is direct service-connection, which is achieved when the record indicates an in-service event, a current medical condition, and a nexus between that event and the current condition. The nexus is normally provided through competent medical authority. However, another method of providing service-connection is through the use of a presumption of service-connection. Presumptive service-connection may be appropriate, for example, to overcome difficulties of proof in establishing that condition appearing after service is the result of a particular hazard encountered during such service or where the fact of exposure to the hazard is difficult to document. In particular, widespread herbicide use in the Republic of Vietnam during the Vietnam War has been well-documented, but is not feasible to determine whether and to what extent a particular Vietnam veteran was actually exposed. As a result, veterans who served in the ground—on the ground in Vietnam and on inland waterways are presumed to have been exposed to herbicides for purposes of application of the presumptions of service-connection for diseases recognized by VA as associated with such exposure.

Presumptive service-connection differs from direct service-connection in that the nexus between the current medical condition and the in-service event need not be established by additional medical evidence. VA has identified presumptive diseases associated with in-service events that include internment as a prisoner of war, service in a tropical environment, service in the Persian Gulf, certain service involving radiation exposure, and service involving exposure to herbicides such as Agent Orange. The Agent Orange Act of 1991 created a procedure for establishing presumptions for service-connection for diseases associated with exposure.

The Secretary of Veterans Affairs is required to consider reports received from the National Academy of Sciences and all other medical and scientific information and analysis on the health effects of herbicide exposure. When the Secretary finds a positive association between herbicide exposure and the occurrence of a disease, the Secretary initiates a rule-making procedure to add the disease. A similar process was created by Congress to address concerns of Gulf War veterans. Presumptions can be a powerful tool for promoting efficiency, fairness, and justice claims adjudication.

With specific respect to Camp Lejeune, VA does not operate a registry for this population or have special authority to enroll for health care veterans or their family members based upon service at Lejeune. The Marine Corps does have such a registry and VA has been working with DOD to get useful data for veterans who were stationed at Lejeune from the database. It has been estimated that approximately one million veterans and their dependents were assigned to Camp Lejeune during the period of the drinking water contamination. Veterans who are part of this cohort may apply for health care enrollment if they are otherwise eligible and are encouraged to discuss any specific concerns with their health care provider.

VA processes disability claims based on service at Camp Lejeune and possible exposure to chemical contaminants on a case by case basis. This approach has been adopted because the evidence to date on the long term health effects due to potential contaminated drinking water at Lejeune is inconclusive. Establishing presumptive diseases at this point would be premature. Approximately 200 claims have been received based upon service at Camp Lejeune and approximately 20 veterans thus far have been granted service-connection on a direct basis, most commonly for kidney diseases, non-Hodgkin's, and other cancers. For those cases that have been denied, claims have normally not been granted because of one or three criteria: the veteran did not serve at Lejeune during the period of the contamination, the current disease, or disability and the medical nexus between the current disease was not established.

VA takes seriously its mission to ensure that veterans receive adequate services and compensation to honor their service to this nation. We are also committed to ensuring that the best medical and scientific information available informs the decisions we make. The exposure at Camp Lejeune presents a number of unique challenges. We are confident that we are addressing these challenges using the best possible science at our disposal to provide for the effected veterans, and we will continue to award benefits to veterans who present substantiated claims.

This concludes my testimony and I would be happy to answer any questions.

[The prepared statement of Mr. Pamperin follows:]

PREPARED STATEMENT OF THOMAS J. PAMPERIN

Chairman Miller and Members of the Subcommittee:

Thank you for this opportunity to discuss the efforts undertaken by the Department of Veterans Affairs (VA) regarding water contamination at the Camp Lejeune Marine Corps Base in North Carolina and to explain the disability compensation process for potentially affected Veterans. I am pleased to be accompanied by Dr. Victoria Cassano, Director, Radiation and Physical Exposures Service, Veterans Health Administration.

Potential Water Contamination

A 2007 final report of the Veterans Disability Benefits Commission, a Congressionally mandated independent review board, raised general awareness at VA of the potential water contamination at Camp Lejeune. The report indicated that the Agency for Toxic Substances and Disease Registry (ATSDR), in the Department of Health and Human Services, had conducted an environmental assessment of Camp Lejeune during 1997. ATSDR found that from the 1950s through the mid-1980s, persons residing or working at Camp Lejeune were potentially exposed to drinking water supplies contaminated with volatile organic compounds from an off-base dry cleaning facility and from on-base sources. These organic compounds included trichloroethylene and perchloroethylene. Subsequent investigations also found evidence of benzene in the same water supplies, presumably caused by leaking fuel storage tanks.

In October 2008, the Department of the Navy issued a letter to Veterans who were stationed at Camp Lejeune. The letter explained that the Navy had established a health registry and encouraged those who served there to participate. In December 2008, VA issued a VA Health Care Fact Sheet on the contamination of the ground water at Camp Lejeune.

In 2009, the National Academy of Sciences' National Research Council (NRC) released a study titled, *Contaminated Water Supplies at Camp Lejeune, Assessing Potential Health Effects*. Currently, additional studies on the contaminated water, parameters of likely exposures, and potential adverse health effects, are being conducted by ATSDR.

In response to the NRC's study, VA assembled a Task Force consisting of the Under Secretary for Health, the Acting Under Secretary for Benefits, the General Counsel, and the Assistant Secretary for Policy and Planning. The Task Force's mission is to determine whether the NRC provided a sufficient scientific basis for determining whether the population of Camp Lejeune has, in fact, suffered adverse health effects as a result of exposure to contaminants in the water supply. The Task Force is continuing its work and will submit its findings to the Secretary for consideration.

VA Disability Compensation Benefits

In keeping with our mission to care for Veterans, VA stands ready to provide treatment and compensation for any Veteran whose current disability is the result of service at Camp Lejeune. My testimony today will outline VA's disability claims process, including the issue of presumptive disabilities, and then address the specific situation at Camp Lejeune.

VA provides compensation payments to Veterans with current disabling conditions that, among other things, were caused or aggravated by an event, injury, or disease that occurred during military service. These conditions resulting from military service are referred to as "service-connected disabilities." There is more than one way to establish service connection. Establishing service connection on a "direct" basis is the most common means. Service connection generally requires sufficient evidence of an in-service event or injury, a current disability, and a link or nexus between the disability and the in-service event or injury. The medical nexus is often established through an examination and opinion from a competent medical authority.

Another method of establishing service connection is through use of a presumption of service connection. "Presumptive" service connection may be appropriate, for example, to overcome difficulties of proof in establishing that a condition appearing after military service is the result of a particular hazard encountered during such service. A presumption may also be used in appropriate circumstances to establish exposure to a particular hazard in military service where the fact of exposure to the hazard is difficult to document. In particular, widespread tactical herbicide use in the Republic of Vietnam during the Vietnam era has been well-documented, but it is not feasible to determine whether, and to what extent, a particular Vietnam Veteran was actually exposed. As a result, Veterans who served on the ground in Vietnam, or on its inland waterways, are presumed to have been exposed to herbicides for purposes of application of the presumptions of service connection for the diseases recognized by VA as associated with herbicide exposure.

Presumptive service connection differs from direct service connection in that the nexus between the current medical condition and the in-service event need not be established by additional medical evidence. The nexus is presumed to exist based solely on experiencing the in-service event and subsequently developing the disabling medical condition that is scientifically linked to the in-service event. Diseases that are presumed associated with specific in-service events are commonly called "presumptive diseases." VA has identified presumptive diseases associated with in-service events that include: internment as a prisoner of war; service in a tropical environment; service in the Gulf War; certain service involving radiation exposure; and service involving exposure to certain herbicides, such as Agent Orange.

Presumptive Decision Processes

The Agent Orange Act, passed by Congress in 1991, created a procedure for establishing presumptions of service connection for diseases associated with herbicide exposure. The procedure for establishing presumptions for particular diseases associated with herbicide exposure requires the Secretary of Veterans Affairs to consider reports received from the National Academy of Sciences and all other sound medical and scientific information and analysis on the health effects of herbicide exposure. When the Secretary finds a positive association exists between herbicide exposure and the occurrence of a disease in humans, the Secretary initiates a public rulemaking proceeding to add the disease to the presumptive list.

Although the procedure established by the Agent Orange Act addresses presumptive service connection based on herbicide exposure among Vietnam Veterans, a similar process was created by Congress to address the concerns of Gulf War Veterans.

These procedures rely on consideration of sound scientific and medical evidence and analysis from the respected National Academy of Sciences and a standard of evaluation based on association rather than causation. Presumptions can be powerful tools for promoting efficiency, fairness, and justice, but they must be considered with great care and respect for the science involved. They will continue to be an important part of the Veterans' benefits scheme for the foreseeable future.

Disability Claims Based on Service at Camp Lejeune

VA does not operate a registry for this population and does not have special authority to enroll for health care Veterans or their family members based upon service at Camp Lejeune. It has been estimated that approximately one million Veterans and their dependents were assigned to Camp Lejeune during the period of drinking water contamination. Veterans who are a part of this cohort may apply for health care enrollment, if they are otherwise eligible, and are encouraged to discuss any specific concerns they have about this issue with their health care provider. VA environmental health clinicians can provide these Veterans with information regarding the potential health effects of exposure to volatile organic compounds, and VA's three War-Related Illness and Injury Study Centers are also available as a resource to providers. However, the Marine Corps does have a registry and VA has been working with DOD to use this registry database to get useful data on Veterans who were stationed at Camp Lejeune.

VA processes disability claims based on service at Camp Lejeune, and possible exposure to chemical contaminants, on a case-by-case basis. This approach has been adopted because the evidence to date on the long-term health effects on Veterans due to potential contaminated drinking water exposure at Camp Lejeune is inconclusive. Establishing presumptive diseases at this point would be premature.

The NRC study on Camp Lejeune underscores the difficulty involved with determining which part of the water supply was contaminated, who may have been exposed to contamination, and to what extent any exposure may have occurred. To address these issues, ATDSR is conducting ongoing studies. In addition, as noted earlier, the Task Force is continuing its work. At this time, we consider direct service connection to be the most feasible and equitable option for addressing disability claims based on service at Camp Lejeune.

VA regional office personnel were alerted to the Camp Lejeune situation in a nationwide broadcast in June 2009 and instructed to evaluate related claims on a case-by-case basis. A training letter followed on April 26, 2010, which outlined specific directions on developing evidence and ordering medical examinations for Camp Lejeune-related claims.

As part of the current examination procedure, VA medical examiners receive information on the chemical contaminants present in the water supply and are asked to provide an informed medical opinion as to whether it is at least as likely as not that the Veteran's current disability is related to service at Camp Lejeune. This evidence, as well as evidence based on examinations and opinions from private physicians and medical providers, is used to determine eligibility for service connection. In cases where the evidence for and against service connection is approximately equivalent, the benefit of doubt is given to the Veteran and service connection is granted.

Currently, VA has received approximately 200 disability claims based on service at Camp Lejeune, and approximately 20 Veterans have been granted service connection on a direct basis. Those that were not granted service connection failed to meet one or more of the' three criteria of: (1) service at Camp Lejeune during the period of water contamination; (2) a current disease or disability; and (3) a medical nexus or link between a current disability and service at Camp Lejeune.

Conclusion

VA takes seriously its mission to ensure that Veterans receive adequate services and compensation to honor their sacrifices in service to our Nation. We are also committed to ensuring that the best medical and scientific evidence available informs the decisions we make. The exposure at Camp Lejeune presents a number of unique challenges, but we are confident that we are addressing these challenges using the best possible science at our disposal to provide compensation to affected Veterans. As I said earlier, VA has already awarded benefits to Veterans who have demonstrated that they are suffering due to adverse exposures at Camp Lejeune. We will continue to award benefits to Veterans who present substantiated claims, and the Secretary will review the findings of the Task Force to determine if any further action is necessary.

This concludes my testimony. I would be happy to answer any questions Members of the Subcommittee may have.

BIOGRAPHY FOR THOMAS J. PAMPERIN

Mr. Pamperin is the Associate Deputy Under Secretary for Policy and Program Management of the Veterans Benefits Administration for the U.S. Department of Veterans Affairs.

Chairman MILLER. Thank you, Mr. Pamperin. We will now have questions and I now recognize myself for five minutes. You all have all said that you did not have personal counsel here, but it does appear that you all are pretty lawyered up, that there is a great deal of concern at ONV and at the Pentagon about potential liability. I understand that all of your testimony was reviewed closely by lawyers of public justice for any effect it might have on any potential liability claims.

Dr. Portier, this Subcommittee's interest in ATSDR and my interest began with their conduct in the FEMA trailers case where FEMA's lawyers asked specific for health assessment for use in pending litigation and asked that for purposes of the assessment that ATSDR assumed that the exposure to formaldehyde was two weeks or less when in fact people living in those trailers had lived in those trailers for well more than a year already by that point with no end in sight. And stunningly ATSDR did that. And Dr. Frumkin when he testified that there was no way that ATSDR should have provided a health assessment that was driven or affected by litigation concerns. They should have given a straight up assessment of what the effect of formaldehyde exposure could be. There are now several ATSDR studies pending in this area.

What role do you expect lawyers to—and I have nothing against lawyers, I am in recovery myself, but there is a difference between Government lawyers and lawyers for private entities. Government lawyers serve the whole people. A—they are—they perhaps should not do what a lawyer for a private company might do which would be to assert any defense legal or factual for which there is some basis. But Government lawyers should perhaps serve the whole people. What role, Doctor, and the rules of professional conduct recognize that with respect to Government lawyers and DA's. They aren't expected just to get convictions but to do justice. What role, Dr. Portier, do you expect lawyers to have in reviewing the work of the ATSDR in this area?

Dr. PORTIER. Mr. Chairman, having been at ATSDR for a short period, it is somewhat difficult for me to know exactly what the pathway is through internal clearance. So I will speak from the point of view of what I would perceive as what I would like to see. And if there is a different pathway that is required that takes me through the Department of Justice for approval, I will come back to you and respond directly on that issue.

As a general rule, I believe that lawyers are very helpful in the types of exercises we are doing here. They help us avoid pitfalls of improperly storing our data, improperly reaching conclusions. They provide a good challenge for us in terms of defending our science appropriately and correctly. However, I don't see any pathway that would take what we are doing for Camp Lejeune through internal legal review at CDC or the Department of Health and Human Services.

Chairman MILLER. Okay. General Payne, you were interviewed by CBS News and said that the wells were closed within 30 days of finding the source of the contamination. I said earlier because the first panel that I found it puzzling that you would wait to find the source to act. That if it certainly appeared that once you found that there was contamination you would act to close the wells rather than wait to find the source. What was the reason for waiting to find the source to act to close the wells?

General PAYNE. Sir, there may have been a poor use of words on my part by saying source. My intent in that answer was to say that once we knew the specific wells that were contaminated, those specific wells, those 10 wells were closed down immediately.

Chairman MILLER. Immediately within 30 days of when you determined that there was contamination of specific wells?

General PAYNE. That is my understanding, yes, sir. Once we knew the specific well, that well was shut down right away.

Chairman MILLER. My time has expired. I now recognize Dr. Broun for five minutes.

Mr. BROUN. General Payne, thank you for your service to the Nation, sir. Semper fi. Dr. Clapp, as the Chairman pointed out when he was interviewing the first panel, Dr. Clapp had an apparent discrepancy related to your testimony and just wanted to be sure that in all fairness even prior to your presenting your testimony that you had an ample opportunity to rebut or respond to that if there is anything more that you would like to say, I would certainly give you that opportunity right now, sir.

General PAYNE. Sir, I think that we really do not have a disagreement with anything that Dr. Clapp said. And I think the question that came up was relative to a statement we made in the pamphlet that we produced. And I think that statement was factual. Perhaps it could have been worded differently. Perhaps it could have been lengthier with a greater explanation.

I think that the only rebuttal that I would offer is that we are looking forward to continually—continuously working closely with ATSDR and other scientific organizations to try find answers. And I think we are all in concurrence there.

Mr. BROUN. Thank you, General. There have been many criticisms on how the Marine Corps, the Navy has responded to the contamination of the water supply there at Camp Lejeune. Looking back over the past 30 years is there any action or inaction that you would have changed?

General PAYNE. Sir, there are a number of actions that I would have changed. I would—I can't tell you how many times over the last three years in working with this issue on behalf of the Marine Corps, I would have given anything to have rolled back the clock and to have known and to have been able to influence during that era what we know today to be the case. It is astounding some of the things that happened, and I think that they happened for a number of reasons. I think part of it was mentioned earlier. I think we were ignorant, quite frankly, of some of the implications. I think we were lulled into a sense of complacency or at least a lack of urgency by the fact that we were not out of compliance. And I am not trying to excuse what happened. I think that there were many, many errors made on behalf of the Marine Corps. But it is difficult to look back through the lens of 2010 at what we did or did not know, or should or should not have done in the '60s, '70s, and early '80s, but there are many things that I would have done differently. There are things I would have done differently 5 and ten years ago. I have only been working this for about three years and it is—one normally shakes their head and wonders at some of the things that did or did not occur.

Mr. BROUN. Thank you, General. I appreciate your diligence in pursuing this. And had we look back and President Washington was bled to death by a physician thinking that that was going to cure his disease and his pneumonia at the time, and obviously that was the wrong medical decision as a physician, just what I was taught in medical school as being absolute truth has been just within five years after graduation we were treating patients totally different in a different manner. And certainly it is difficult looking in a retrospectoscope and saying what we should have or could have done at a particular period of time. We have to act on the knowledge that we have the science we have at the period of time. And I thank you for your diligence in trying to head in the proper direction on this issue.

Let us see, Dr. Portier, the NAS report also stated that based on review of toxicological studies—that is hard for a southerner to say, while there is some evidence linking certain diseases and health effects to PCE and TCE exposure, studies suggest that the highest level exposure at Camp Lejeune were "much lower than the lowest dose that cause adverse effects in the most sensitive strains in species laboratory animals".

Furthermore, the NAS report also concluded that there is limited evidence to suggest a correlation between diseases exposure to TCE and PCE in epidemiological studies. How do the conclusions reached by the NAS report compare with the evidence gathered and analyzed by ATSDR over the last 20 years?

Dr. PORTIER. Thank you for the question. The ATSDR has not really released a formal response on their opinion of the academy's report. I guess personally I would say that my opinion matches that of Dr. Clapp and his colleagues that I have some degree of confusion over how the academy reached these decisions.

In terms of ATSDR, our actions speak louder than our words and in this case we are moving forward with the studies. We are doing the water modeling. We are going to go forward and evaluate this population because we believe it is scientifically credible. We believe it is the right public health move, and we believe it is what needs to be done. And so we will do it. And I think that is our answer to the report from the academy.

In terms of their finding that there is limited information relating TCE and PCE to disease, I simply need to look at the disease of cancer and point out to them that virtually every national authority or international authority that look at—that has looked at TCE and PCE has labeled it reasonably anticipated to be a human carcinogen or a probable human carcinogen. And so the linkage there is extremely strong. There is no doubt in my mind that these are toxins that you do not want in your water.

Mr. BROUN. Thank you. My time is up, but if I may, Mr. Chairman, if I could ask Dr. Portier, do you have any idea of when we will get another health assessment report and when will that be available, sir? Do you have any prospect?

Dr. PORTIER. There will be a series of reports coming out. I am very confident that the data mining working team will have all the data hopefully in hand by the end of next month. And that done, we should have the water modeling by about a year from now available internally to use in the EPI studies. We have already paralleled working the EPI studies, so hopefully they will be finished probably about March of 2012 and that is when we will begin issuing reports at about that time.

Mr. BROUN. Thank you. I yield back, Mr. Chairman. Thank you for your diligence——

Chairman MILLER. Indulgence.

Mr. BROUN. —indulgence. Thank you.

Chairman MILLER. The Chair now recognizes Mrs. Dahlkemper for five minutes.

Mrs. DAHLKEMPER. Thank you, Mr. Chairman. I want to thank the witnesses for coming today and for your testimony. Mr. Pamperin, I want to ask you a little bit about the claims process. And the VA has granted just a handful of claims to all of these veterans resulting from their service at Camp Lejeune. What criteria does the VA use to determine that harm has been done to these veterans as a result of their service there? And do you believe that the standards are appropriate to justify small claims process and that it's consistently applied to each person coming forward?

Mr. PAMPERIN. Thank you, ma'am. We sent a fairly extensive training letter to our field stations back in 2009 that covered a number of environmental hazard locations and situations, one of which was Camp Lejeune. Prior to that I would not have confidence that our claims examiners would have had the kind of information they needed to ask the appropriate questions, to solicit the appropriate medical opinions.

That training letter served basically three purposes. First was to educate our staff. The second was to tell our staff on how to develop these kinds of claims, and the third was to provide our staff with a fact sheet on each particular exposure that was to be provided to the clinician who was going to be doing the exams, so that they understood the nature of the exposure that was made. Because of the relatively—relative certainty of the known outcomes of benzene, what we are dealing with with these cases is the fact that there is invariably nothing in their service medical record that would indicate a disease since most of these diseases take years to develop. So what our rating officials are doing with this a current a disability and now a known exposure. And that—what they need is clinical evidence attaching that current disability to that exposure. If they have that kind of medical evidence, they can award service-connection on a direct basis, and that is what we have been doing thus far. That does require that we assist these veterans in getting that kind of clear and concise clinical opinion and that is what the purpose of the fact sheet to be provided to the examiner was for.

Mrs. DAHLKEMPER. Can we get a copy of that letter and the fact sheets for the record please?

Mr. PAMPERIN. Yes, ma'am.

Mrs. DAHLKEMPER. So your education staff and I think it was Mr. Watters who said he was having trouble even getting something posted at the VA in his community until he said he was coming here to testify today. He said that during his testimony. Can you tell me if that is standard in all VA's? I only have two in my district. I am going to be following up on this when I get out of here today.

Mr. PAMPERIN. Ma'am, I am not sure what has been posted in VA Medical Centers. We can certainly take that for the record. I believe that the training letter was shared with the Veterans Health Administration so that it would be generally known inside that community as to what kind of claims we were getting. But we can take that for the record.

Mrs. DAHLKEMPER. And one of my concerns is I know even now we are trying to help some of our soldiers with a stop-loss payments we are supposed to receive. We can't even find them, so and these people over the years are scattered all over this country and across this globe and probably have no idea of possible exposure that they have had.

Mr. PAMPERIN. Ma'am, all I would say is that if a soldier, or a Marine, or a naval personnel who were at Camp Lejeune is concerned about their health they should apply for enrollment in VHA. And if they have a condition that in their mind may possibly be related to their service at Lejeune that they should file a claim and we will adjudicate it appropriately.

Mrs. DAHLKEMPER. Thank you. My time is running short, so just one quick question for General Payne. There is a difference I think between saying no study has been completed on the health effects of exposure to chemicals and saying that studies have not found a link between chemical exposure and specific illnesses or diseases. The language in the brochure is simply misleading on this issue. So I guess I am going to ask you would you like to correct that for the record?

General PAYNE. Ma'am, I would agree with the wording issue just presented that studies are ongoing. It is of—I don't think we were factually wrong in the brochure as I understand it, but we—it was not our intent to mislead in any way. We are still working very hard to try to find answers. We are working very hard to locate former Marines, and their dependents, and civilian employees.

Mrs. DAHLKEMPER. Can I ask how this is distributed, or how any of this information is distributed? As I said we are having trouble getting more recent Marines and soldiers to apply for stop-loss payments and so how are we trying to find these individuals?

General PAYNE. It is a combination of ways that we are trying to locate them. As I mentioned earlier we have got about 163,000 registered to date. We've had over 30,000 in the last year. We get new registrations every week. We are pursuing it through the media, through radio, television, through the print media, through magazines, through the internet. We even are using social media like Facebook. We utilize other governmental agencies like the Veterans Administration who have been very good about distributing posters and letting people know. We use a lot of military journals, and newsletters, and magazines, and we are searching for additional ways to try to get the word out.

Mrs. DAHLKEMPER. I appreciate your efforts on that. I—one short question, just one answer. When did you start doing this reach out? What was the date of when this started to try to locate all these individuals?

General PAYNE. It started in 2007.

Mrs. DAHLKEMPER. Okay, thank you very much.

General PAYNE. Yes, Ma'am.

Mrs. DAHLKEMPER. I yield back.

Chairman MILLER. Thank you. I think we have time for a second round, and I now recognize myself for five minutes. General Payne, you said that the wells were closed promptly when you figured out which wells were contaminated. That that was what you meant by source, which wells were contaminated. But the memo from Ms. Betts dated August 10, 19—or 10 August 1982, I guess the military—which referred to the tests which were conducted three or four months earlier in May said with respect to tetrachloroethylene that while they were not regulated, they were not subject to Safe Drinking Water Act at that point. They were—that was known to cause certain cancers. And trichloroethylene—liver damage, kidney damage, central nervous system disturbances in humans. There does not appear to have been a sense of urgency if the problem was identifying which wells, there doesn't seem to have been a great sense of urgency in figuring out which of the 22 wells. Did it take two years to figure out which of the 22 wells and why was there not more urgency than that to the task?

General PAYNE. In answer to your question, yes, it did take that long. It—but also I would concur with you, sir, that there was not the level of urgency that there should have been. And it is astounding to me why there wasn't. I can only surmise, I can only speculate at this point, but I think it was a combination of about three things that contributed to that. I think that we genuinely were ignorant of the potential health effects. I think number two, the fact that we were not out of compliance decreased a sense of urgency that should have been there. Knowing what we know today it is amazing that there wasn't an absolute, all out effort immediately. And I think number three, the other contributing factor was the inconsistency of the test results. We would test the water, and we were doing it at not—we were not testing at that time individual wells. We were testing the water treatment plants. And we would test and we might end up with a result of, I mean, 1,100 parts per billion which is exceedingly high. And so we would retest and on our retest we might come up with five parts per billion which would be exceedingly low. And I think that inconsistency because of the water distribution system at that time also confused the issue and added to the amount of time. But I concur with you 100 percent that there should have been a greater sense of urgency knowing what we know today and it is amazing to me that there was not.

Chairman MILLER. General Payne, you heard my earlier question of Dr. Portier about what role lawyers would have. The—we have asked the question about who had reviewed the booklet Mrs.

Dahlkemper asked about earlier and the answer we got was—the question was has anyone reviewed it, any other agency. VF recalls that there are cases pending in court where the Department of Justice represents the part of Navy. We provided DOG attorneys—DOJ attorneys to a preview of the booklet in order to avoid inadvertently harming their cases. Again, going to the example of FEMA and the FEMA trailers with high levels of formaldehyde, not only was that health assessment used by FEMA attorneys in negotiating with claimants—settlements with claimants, based upon supposedly expert testimony or expert evidence that was based upon wrong assumptions but FEMA took that assessment to tell the people in the trailers they didn't have anything to worry about. They could just open the windows and doors if the formaldehyde gave them a headache. Are you having your—what you are telling people who were exposed to this are you having that shaped by lawyers who were worried—are worried about litigation issues not telling what they need to know?

General PAYNE. Sir, I can't really speak for what might have happened prior to my engagement in this issue, but I can tell you sincerely over the last three years even though we run this stuff routinely through our legal personnel, never in the last three years have I been advised by our attorneys or by DOJ not to say something. And I don't know whether they trust that I won't say the wrong thing or if they believe that telling me that won't do any good. But for whatever the reason I can tell you that I have not been counseled by our attorneys as to specific answers.

Chairman MILLER. And it did take the Marines 20 years to tell the people exposed, the Marines and their families of the exposure. It took an act of Congress. I recognize Senator Dole for that effort. Why did it take 20 years to let Lejeune veterans, the Marines who served at Lejeune know of the exposure?

General PAYNE. Sir, I think the initial efforts by the Marine Corps which lasted way too long, the initial position was that we could do the best we could be number one, trying to find answers. I am contacted continuously by former Marines and their families, and the number one thing that they want to know is—they want answers to questions that we can't provide them. That's why we have taken that approach. Now, I would agree with you that it should have happened long before, but there are two schools of thought. And I even heard a school of thought recently that said until you have answers, just contacting them raises more doubts and puts in more fears. I disagree with that and I think that we have done the right thing for the last three years. I wish we had done it sooner, far sooner that we owed it—we owed a responsibility to those Marines and their families. And we should have done that rather than just concentrating on trying to find answers. We should have had a dual effort, and it should have been aggressive, and it should have been far sooner.

Chairman MILLER. My time has expired. I now recognize Dr. Broun for five minutes.

Mr. BROUN. Thank you, Mr. Chairman. Mr. Pamperin, in the National Academy of Sciences study, the Department of Veterans Affairs convened a task force to determine whether the NRC provided a sufficient scientific basis for its conclusions. Who is on this task force? Are they doctors, scientists, epidemiologists, toxicologists, or other specialists that are qualified to make this determination? And when is the task force planning on submitting these findings for the Secretary? Once the task force has submitted its findings how long will the Secretary issue his determinations?

Mr. PAMPERIN. Congressman Broun, I will take those questions for the record in terms of the specific people who are on the panel, but routinely these are members of the Veterans Health Administration Clinicians who review this sort of stuff. People from out environmental exposures staff. I do not know when they are going to be done. I would be happy to provide that answer in written form, and based upon that response the Secretary will need to assess that. I can't give you a specific date when he'll be done.

Mr. BROUN. Thank you so much. Mr. Chairman, and you are very generous in your indulgence and I will yield back and we will present other questions from written answers. Thank you, Mr. Chairman, I yield back.

Chairman MILLER. Thank you, Dr. Broun. I am always generous in indulgence. The Chair now recognizes himself for one final question. Dr. Portier, the ATSDR is now preparing several reports, five separate studies on the human health consequences of the exposures, the toxic exposures at Camp Lejeune. And I know that you can't know in advance what the studies will show, but some apparently think that the studies will establish with certainty which specific people got which specific diseases as a result of exposure versus who would have gotten it anyway—who might have gotten breast cancer anyway. There is a 1 in 100,000 chance of that, so maybe a few of those folks would have gotten breast cancer anyway. Probably a few would have. What kind of—and Dr. Clapp said in his testimony that that was not the way it worked. What kind of certainty should we expect to come out of ATSDR's reports?

Dr. PORTIER. An excellent question, Mr. Chairman, an excellent question. The studies will—are designed to address the questions of TCE, PCE, and benzene exposure as they relate to large human populations, in this case the population of people who have moved in and out of Camp Lejeune Marine Corps Base. Each individual in any one of these studies, whether it is Camp Lejeune or anywhere else in the world, individuals' risk to a particular toxin exposure depends upon not only the toxin exposure, but other things they are in their lifespan. The food, their genetics, everything else plays a role in terms of their overall risk. What you are looking at though is shifts in risk in the population. That is what this type of study will give us. When you look at the brochure that the Marine Corps had put together one of the issues with that brochure that we have is that it assumes that the only way in that you can answer the question is through studying the marines at Camp Lejeune. But the data we are getting from Camp Lejeune is part of the broader scientific literature that already exists that deals with these particular types of exposures. We expect that we will see some positive results, some negative results that match or disagree with what is in the literature. Hopefully if we have done it right, we will strengthen that literature and by strengthening that literature help groups like the Veterans Administration better understand what to do with this population based exposure. But it is not just these studies that should be used in that overall evaluation. It is the broader scientific literature and the contribution of these is important, but that is not all that should be used.

Chairman MILLER. And let the record reflect that I did not think that anyone should be exposed to toxic chemicals for the purpose of conducting research. The Chair now recognizes Dr. Broun for five minutes.

Mr. BROUN. Well, likely I won't need that much. I appreciate it. Just to add to a comment or a questions on top of Dr. Portier, from what you—the question of the Chairman, when we compare epidemiological instances of any subgroup of a population to the general population in studies to look for instance or increased instances of disease entities, we looked at the general population and I am just wondering if you are looking at the general population in the general area instead of the population overall in trying to figure out the epidemiological association in the health risk. Are you looking at people within the Jacksonville area or that part of the state of North Carolina and comparing them to the population at Camp Lejeune or are you looking just generally at the whole—the population at the whole of the country?

Dr. PORTIER. Dr. Broun, that is a question we really spent a lot of time looking at and it depends on the type of study that we are doing. But to answer your question most specifically, the studies that we are most interested in pursuing, the ones that were most—we think that will be most informative—are our cohort study and the health survey study. I think those will be the most extensively useful. In those cases we actually have a control population. We are comparing—because Marines are inherently healthier than the rest of us—we are comparing the people who were at Camp Lejeune to people who were at Camp Pendleton at the same time. So we are looking at a comparison that is effectively, hopefully about the same in terms of age, in terms of fitness, in terms of the type of food, in terms of the types of environments they are in so we can potentially get a very good, solid comparison.

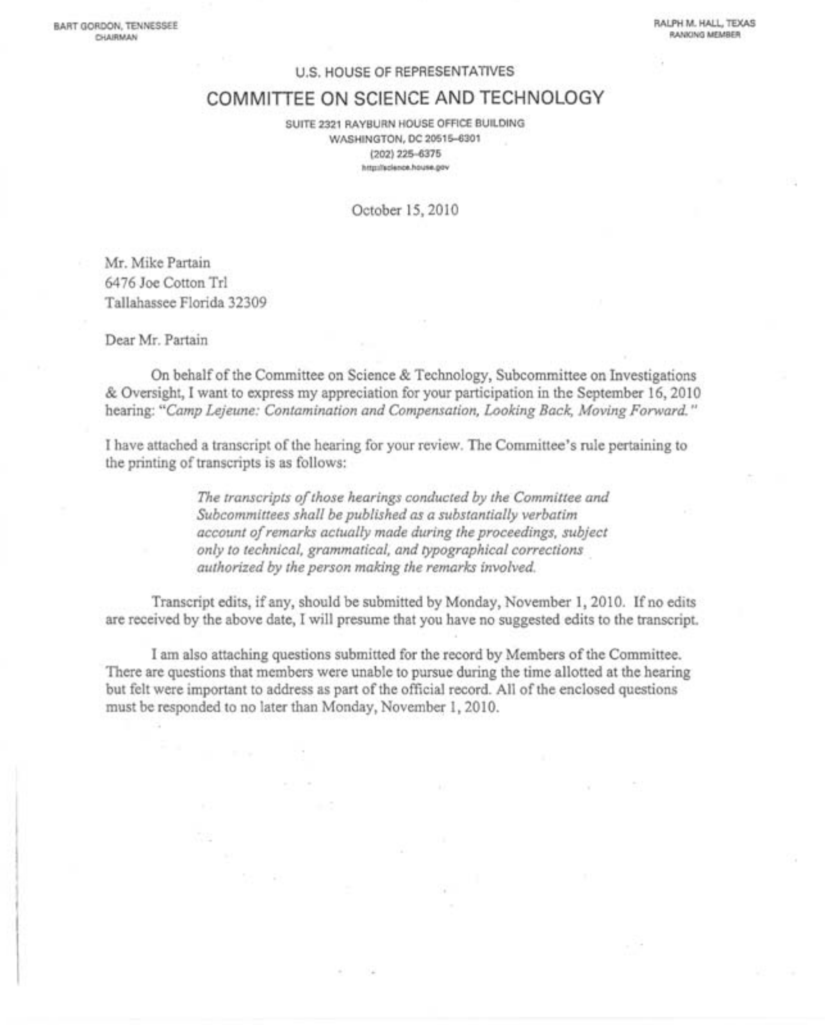
Mr. BROUN. Well, Dr. Portier, I suggest that you are not comparing apples to apples there because you are certainly in some respects you are, but the people who living at Camp Pendleton are not living in the Jacksonville area. So I encourage you to look at the general population not just at Camp Lejeune, not comparing Camp Pendleton versus Lejeune, but look at the people in that area of North Carolina and include them in seeing if you see any differential, because you are selectively eliminating a population that I think from a scientific perspective needs to be looked at. So I encourage you to do so. Thank you, Mr. Chairman. I yield back.

Chairman MILLER. Thank you, we—before we bring the hearing to a close I want to thank our witnesses for testifying before our Subcommittee today. The record will remain open for two weeks for additional statements from the members and will remain open for answers to any follow-up questions the Subcommittee will have for witnesses. The witnesses are excused. The hearing is now adjourned.

[Whereupon, at 1:11 p.m., the Subcommittee was adjourned.]

Appendix 1:

ANSWERS TO POST-HEARING QUESTIONS



BART GORDON, TENNESSEE
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October 15, 2010

Mr. Mike Partain
6476 Joe Cotton Trl
Tallahassee Florida 32309

Dear Mr. Partain

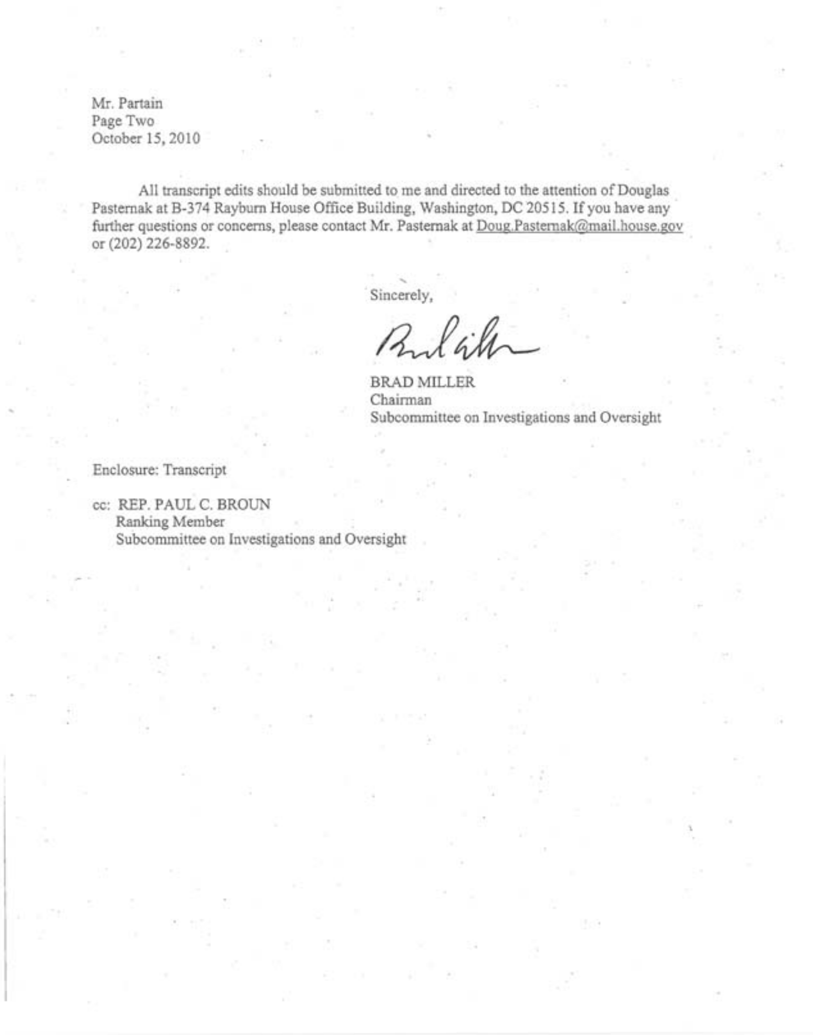
On behalf of the Committee on Science & Technology, Subcommittee on Investigations & Oversight, I want to express my appreciation for your participation in the September 16, 2010 hearing: "*Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward.*"

I have attached a transcript of the hearing for your review. The Committee's rule pertaining to the printing of transcripts is as follows:

> *The transcripts of those hearings conducted by the Committee and Subcommittees shall be published as a substantially verbatim account of remarks actually made during the proceedings, subject only to technical, grammatical, and typographical corrections authorized by the person making the remarks involved.*

Transcript edits, if any, should be submitted by Monday, November 1, 2010. If no edits are received by the above date, I will presume that you have no suggested edits to the transcript.

I am also attaching questions submitted for the record by Members of the Committee. There are questions that members were unable to pursue during the time allotted at the hearing but felt were important to address as part of the official record. All of the enclosed questions must be responded to no later than Monday, November 1, 2010.



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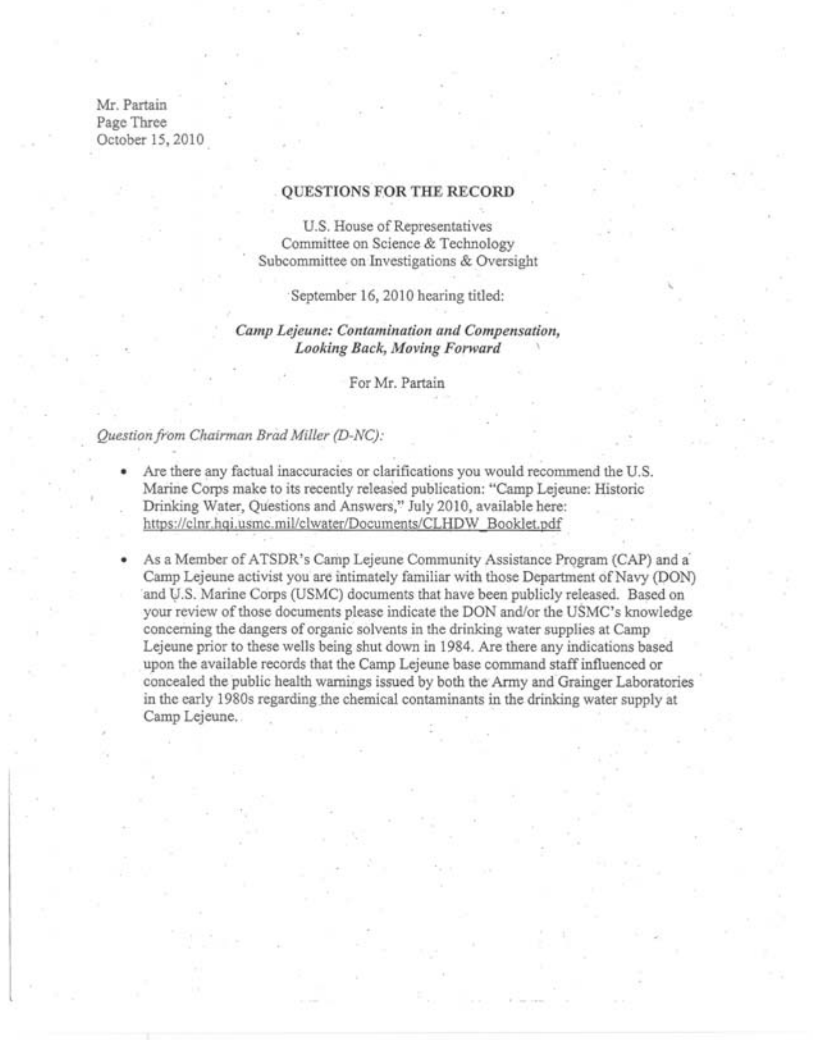
All transcript edits should be submitted to me and directed to the attention of Douglas Pasternak at B-374 Rayburn House Office Building, Washington, DC 20515. If you have any further questions or concerns, please contact Mr. Pasternak at Doug.Pasternak@mail.house.gov or (202) 226-8892.

Sincerely,

BRAD MILLER
Chairman
Subcommittee on Investigations and Oversight

Enclosure: Transcript

cc: REP. PAUL C. BROUN
Ranking Member
Subcommittee on Investigations and Oversight



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QUESTIONS FOR THE RECORD

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

September 16, 2010 hearing titled:

Camp Lejeune: Contamination and Compensation,
Looking Back, Moving Forward

For Mr. Partain

Question from Chairman Brad Miller (D-NC):

- Are there any factual inaccuracies or clarifications you would recommend the U.S. Marine Corps make to its recently released publication: "Camp Lejeune: Historic Drinking Water, Questions and Answers," July 2010, available here: https://clnr.hqi.usmc.mil/clwater/Documents/CLHDW_Booklet.pdf

- As a Member of ATSDR's Camp Lejeune Community Assistance Program (CAP) and a Camp Lejeune activist you are intimately familiar with those Department of Navy (DON) and U.S. Marine Corps (USMC) documents that have been publicly released. Based on your review of those documents please indicate the DON and/or the USMC's knowledge concerning the dangers of organic solvents in the drinking water supplies at Camp Lejeune prior to these wells being shut down in 1984. Are there any indications based upon the available records that the Camp Lejeune base command staff influenced or concealed the public health warnings issued by both the Army and Grainger Laboratories in the early 1980s regarding the chemical contaminants in the drinking water supply at Camp Lejeune.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Mr. Michael Partain, Member, ATSDR Camp Lejeune Community Assistance Panel (CAP) and Breast Cancer Survivor Born on Camp Lejeune

Questions submitted by Chairman Brad Miller

Q1. Are there any factual inaccuracies or clarifications you would recommend the U.S. Marine Corps make to its recently released publication: "Camp Lejeune: Historic Drinking Water, Questions and Answers," July 2010, available here: https://clnr.hqi.usmc.mil/clwater/Documents/CLHDW_*Booklet.pdf*

A1. Unfortunately, the United States Marine Corps continues to abuse their responsibility to keep the affected community properly informed concerning the Camp Lejeune drinking water contamination. To date there has been no acknowledgment or listing of any community sponsored website on the official Marine Corps web site for Camp Lejeune. There has been no attempt by Marine Corps Leadership to meet with any of the members of the affected community and address our concerns and/or grievances with the Marine Corps. The Marine Corps routinely abuses their custodial possession of the Camp Lejeune victim registry to disseminate information that supports only their point of view. General Conway stated in the preface of the July 2010 informational booklet that "This booklet is designed to provide relevant information on the issue and answer many of the questions that have arisen concerning this matter." Until there is an objective reckoning of the historical facts pertaining to the Camp Lejeune drinking water contamination between the United States Marine Corps and the affected community, the Marine Corps' message will simply be nothing more than self serving propaganda.

Overall, We feel the booklet should be retracted and redone with input from both the Marine Corps and the affected community. I sincerely doubt that the Marine Corps would ever agree to this proposal.

Beginning on page 2 in the last paragraph, the sentence beginning with "These chemicals, primarily found" would be more accurate if it advised the reader that the chemicals were found both in the wells and tap water provided to the service personnel and their families on the base.

On page 3 the Marine Corps claims that "once identified, the impacted wells were promptly taken out service." What the Marine Corps failed to inform the reader was that they were first warned about the contamination beginning in October of 1980 and failed to take any direct action to identify the source of the contamination until July 1984. The first well was then closed in December 1984.

On page 4 the time line fails to inform the reader about the existence of the Navy's potable water instruction issued in 1963 (BUMED 6240.3B). The time line also omits Camp Lejeune' 1974 Base Order 5100.13B declaring organic solvents hazardous and warning that disposal practices would contaminate the drinking water. The time line omits the Army laboratory's 1980 recommendation to test for chlorinated hydrocarbons by GC/MS and that this same laboratory advised the Navy that the contaminants found in the drinking water samples were solvents in February/March 1981. The timeline also failed to mention the President's May 2010 annual President's Cancer Panel report which recognized Camp Lejeune as an issue.

On page 5, the map showing the wells should also display the numerous contamination plumes of PCE, TCE, Vinyl Chloride and benzene found on the base.

On Page 6 the booklet once again fails to inform the reader of the Navy's potable water regulations dating back from 1963. There is no mention of the initial warnings from the Army laboratory from 1980 through 1981. The booklet correctly informs the reader that PCE and TCE were identified as the contaminants in 1982 but failed to inform the reader that the wells were not "promptly" removed from service as claimed. The booklet should give the correct date and read "beginning in December 1984, the wells were removed from service."

The timeline on the bottom of page 6 incorrectly stated that targeted TCE/PCE samples taken in 1982 were within EPA recommended levels. Please see CLW 606 PDF page 2 paragraph 8.

The incorrect information concerning the targeted 1982 sampling event is repeated again as a written Q&A on page 7. The response to this question should be rewritten or withdrawn altogether.

The USMC's response to the second question concerning well 602 on page 7 cannot be substantiated by the existing historical record. The well was tested in July 1984 (CERCLA 388) and then closed on 30 November 1984. The actual report or letter from the contractor conducting the Confirmation Study which officially notified the Navy and the Marine Corps that well was contaminated is missing. If the

Marine Corps wishes to assert that they aggressively began testing and identifying the contaminated wells in

1984, then they need to explain why they did not perform the same individual well testing in 1981, as they did for the drinking water system located at the base's Rifle Range. Please see USMC document CLW 3757.

On page 8, the USMC discussed the Navy's 1972 BUMED 6240.3C regulation for potable water systems for all Naval ships and stations. The UMSC correctly stated that BUMED 6240.3C does not specifically regulate TCE and PCE as an individual chemical but failed to explain the preventive measures found in the document designed to protect potable water systems from contamination and pollution, nor do they recognize that the regulation forbade "Substances which may have a deleterious physiological effect, or for which the effects are not known" in a manner in which would permit them to reach the consumer.

On page 10, the Marine Corps discusses three past investigations into the drinking water contamination and all three investigations were conducted without addressing the existence of BUMED 6240.3 regulations, the Base Order 5100.13B or the extent of the fuel loss at the Hadnot Point fuel farm. Furthermore, during the 2007 Congressional hearing regarding Camp Lejeune drinking water contamination, Tyler Amon of the USEPA revealed that he had recommended obstruction of justice charges be filed against certain LantDiv employees. The recommendations were later overruled by the U.S. Attorney.

The question found on page 12 needs to be re-written to reflect Dr. Portier's October 22 2010 letter (attached) to the Navy and this letter needs to be distributed to the affected community.

In response to the second question on page 12, the Marine Corps failed to inform the reader about the existence of a contract between the National Academies and the Navy/USMC concerning Camp Lejeune which was negotiated and signed prior to the release of the 2009 NRC report. Nor is it noted that the contract has since been dissolved after its existence was revealed in the media.

Please see the above response for page 10 in regard to our concerns with page 13.

Page 14 does not include the 2007 Congressional hearing nor does the timeline state why the ATSDR Public Health Assessment was withdrawn.

On pages 16–18 the Marine Corps informed the reader that they are supporting ATSDR's efforts determine when the contamination began but failed to advise the reader that they attempted to withhold funding for ATSDR's studies in January 2010, that they did not inform ATSDR about the extent of the fuel loss at Hadnot Point until it was discovered by a member of the affected community earlier this year nor did the Navy reveal to the ATSDR the existence of a password protected electronic portal containing contamination documents vital to ATSDR's water modeling efforts until after the portal was accidently discovered by an ATSDR subcontractor.

On Page 21, the second question concerning notification should advise the reader that an act of Congress, signed into law in 2008, required the Navy/USMC to notify all residents of Tarawa Terrace of their exposures and that notification of the residents for the Hadnot Point system will begin only after ATSDR completes their water modeling project for Hadnot Point.

The third question on the page regarding whether the Marine Corps tried to cover up the contamination aboard the base is best answered by reprinting the attached *Raleigh News and Observer*'s article containing a quote from the base Environmental Engineer, Robert Alexander, that "People had not been directly exposed to the pollutants."

The timeline for Notification and Outreach found on page 23 should be withdrawn. The timeline is misleading, inaccurate and has many omissions from 1980–1985.

Over the past several weeks we have been informed by members on our web site that the Marine Corps is now distributing their booklet to the affected community. It is our understanding that this same booklet was distributed to every member of Congress immediately prior to the September 2010 hearing. How and when will the affected community be able to air our concerns and grievances with the Marine Corps? The hearing was an important step forward but how can we, the affected community, compete against the self serving propaganda and virtually unlimited resources of the United States Marine Corps and their ability to state whatever they want to say, whenever they wish to say it to whoever they chose?

Q2. As a Member of ATSDR's Camp Lejeune Community Assistance Program (CAP) and a: Camp Lejeune activist you are intimately familiar with those Department of Navy (DON) and U.S. Marine Corps (USMC) documents that have been pub-

licly released. Based on your review of those documents please indicate the DON and/or the USMC's knowledge concerning the dangers of organic solvents in the drinking water supplies at Camp Lejeune prior to these wells being shut down in 1984. Are there any indications based upon the available records that the Camp Lejeune base command staff influenced or concealed the public health warnings issued by both the Army and Grainger Laboratories in the early 1980s regarding the chemical contaminants in the drinking water supply at Camp Lejeune.

A1. Yes there are several indications that both representatives from the Navy's Atlantic Division (LantDiv) and the base command staff attempted to minimize the early contamination warnings issued by the Army and Grainger laboratories from 1980–1984.

According to the historical documents found in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Camp Lejeune Water (CLW) Libraries for Camp Lejeune there are clear indications that the leadership of the Navy and United States Marine Corps knew or at least should have known about the danger of groundwater used for potable water by pollutants used in and around Camp Lejeune. The Navy issued a substantial revision of their potable water regulations in 1963. These regulations known as BUMED 6240.3B applied to all Naval vessels and installations including Camp Lejeune. While the regulation did not specifically regulate PCE, TCE, Vinyl Chloride and Benzene individually as contaminants, the regulation did set forth strict guidelines and preventive measures to prevent contamination of a water supply from extraneous sources. A second order, Base Order 5100.13B, from the base's Commanding General in 1974 revealed that Marine Corps leadership knew that organic solvents were hazardous and that there was a danger of drinking water contamination from improper disposal practices of these chemicals. A 1979 base environmental survey (CLW 245) lists Dry cleaning solvents, trichloroethylene, toluene, xylene and mogas as hazardous materials. Then in 1982 the Base Supervisory Chemist, Elizabeth Betz, noted several adverse health effects linked to tetrachloroethylene and tricholorethylene exposures in her memorandum for the record concerning the 10 August 1982 Grainger Laboratory letter to Camp Lejeune (CLW 606). These documents clearly show that at least by 1963 the Navy understood the dangers between industrial pollution and groundwater contamination.

It is not known at what exact date this relationship was established because the preceding versions for Base Order 5100.13B are missing from the historical record. Furthermore, the order lacked any higher headquarter references which would explain and justify why the Commanding General of Camp Lejeune issued the order in the first place. Without these references we cannot ascertain the exact date when the Navy knew organic solvents and other industrial pollutants including benzene was a hazard to ground water sources used for drinking water purposes. However, a 1986 court case, Clark vs. USA, did establish that by the 1950's it was generally known that TCE was unfit for human consumption.

The Navy's LantDiv was responsible for providing engineering support for Naval facilities, including Camp Lejeune. In 1979 two Naval facilities in Pennsylvania (Warminster and Willow Grove) detected PCE and TCE in their potable water systems. The contaminated wells were identified and closed immediately. Why did LantDiv fail to follow this same policy at Camp Lejeune? As cited in my testimony, representatives from LantDiv accompanied base officials in 1981 to test the Rifle Range system for organic contamination; this testing included the potable wells for that drinking water system. In July 1981 a letter from the Commander of Atlantic Division Naval Facilities Engineering Command to Camp Lejeune's Commanding General, Mr. Bailey of LantDiv advised Camp Lejeune not to use a Rifle Range potable water well found to be contaminated with organics. Concurrently with the testing of the Rifle Range, LantDiv received several warnings that the Hadnot Point water system was highly contaminated with chlorinated organics, including solvents. No action was taken by base officials or LantDiv personnel.

There are two specific examples which illustrate what we believe was a conscious decision by two separate Facility Assistant Chief of Staff Colonels to quash the significance of the Army and Grainger Laboratory's warnings to the base and LantDiv.

The first example took place on 25 August 1982 when Colonel J.T. Marshall responded to a letter from the Navy's Naval Energy and Environmental Support Activity (NEESA) concerning the draft copy of the base's Initial Assessment Study for Camp Lejeune (CLW 6332). The Colonel was tasked to review the draft copy of the report and provide comments by 25 August 1982. During the interim, the 10 August 1982 letter from Grainger Laboratory arrived on the Colonel's desk (CLW 592). Fifteen days later the Colonel responded to NEESA and advised that "Discussion of

Trihalomethane content of Rifle Range on page 2–18 and extensive data shown on pages 6–12 through 6–18 overly stresses relationship with hazardous material/waste disposal. It is important to note that accuracy of data provided by U.S. Army laboratory is questionable. It is recommended that TTHM information be de-emphasized throughout the report." (CLW 6332).

Shortly after the August 1982 response to NEESA, a change order was issued for the IAS in December 1982 (CERCLA 2059). The Grainger findings contained in the 10 August 1982 letter were not included in the change order. The lAS report for Camp Lejeune was then released in April of 1983. The Army and Grainger Laboratory's warnings concerning the Hadnot Point and Tarawa Terrace drinking water contamination were not included in the findings of the report.

The second incident occurred in June of 1983 after Mike Hargett of Grainger Laboratory informed the State of North Carolina about the problem with the base's drinking water systems. On 1 June 1983, Colonel Marshall compiled a table for all of the trihalomethane testing done on the base. He did not include the actual analytical data sheets provided by Grainger Laboratory. The original Grainger data sheets contained written warnings about the TCE and PCE contamination present in the Hadnot Point and Tarawa Terrace potable water systems.

On 2 June 1983, Mr. Larry Elmore, Environmental Engineer from the State's Water Supply Branch sent a letter to Colonel Marshall specifically requesting the analytical data sheets provided to the base by Grainger Laboratory (CLW 940). The base waited almost six months to provide a response. By then, Colonel Marshall was replaced by Colonel Lilley who finally responded to the Mr. Elmore's letter. The Colonel wrote to Mr. Rundgren, head of the Water Supply Branch for the State of North Carolina and resubmitted the trihalomethane tables previously complied by Colonel Marshall along with two additional tables explaining the results. Colonel Lilley also noted that per a 30 November 1983 telephone conversation with Dick Caspers at the Water Supply Branch, the original Grainger lab reports were not submitted as previously requested by Mr. Elmore in his 21 June 1983 letter. Colonel. Lilley then requested that Hadnot Point be reduced from quarterly trihalotmethane sampling to once a year. This same sampling was the source of the initial warning concerning the PCE and TCE contamination on the base (CLW 6348). It is important to note that benzene does not interfere with this type of testing and thus was not detected by either the Army or Grainger Laboratories.

Undoubtedly the interference from these two officers delayed the revelation of Camp Lejeune drinking water contamination for years. During that time tens of thousands of Marines, Sailors, their families and employees of the base were needlessly exposed to dangerous levels of PCE and TCE in the base's drinking water system.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta, GA 30341-3724

October 22, 2010

Mr. Donald R. Schregardus
Deputy Assistant Secretary of the Navy
Environment
1000 Nay Pentagon
Washington, D.C. 20350-1000

Lt. General Frank A. Panter
Deputy Commandant, Installations and Logistics
3000 Marine Corps, Pentagon, Room 4E516
Washington, D.C. 20350-3000

Dear Mr. Schregardus and Lt. General Panter:

I recently met with Senator Kay Hagan (D-NC) regarding our work on the potential for health effects from exposure to contaminated drinking water at Marine Corp Base Camp Lejeune (Camp Lejeune). During our conversation, it became evident that there was still some confusion regarding the position of the ATSDR regarding the 2009 National Research Council (NRC) report, *Contaminated Water Supplies at Camp Lejeune – Assessing* Potential Health Effects. Because of our collaboration and joint concern regarding exposures to military personnel, their families and others at Camp Lejeune, I wanted to be certain you understood our position regarding this report. This letter is intended to clarify our position and to provide a brief explanation on how we reached this position.

There is one constraint and five conclusions in the NRC report that are essential to the issue of whether harm may be expected in populations exposed to Camp Lejeune contaminated drinking water. These relate to:

1. the contaminants and health outcomes considered by the NRC;
2. the dose-response assessment used by the NRC;
3. the water modeling for Tarawa Terrace published by the ATSDR;
4. the use of alternative modeling strategies;
5. the need for detailed statistical analysis plans;
6. the utility of the epidemiological studies proposed by the ATSDR.

I will address each of these issues in sequence.

The NRC report only focused on tetrachloroethylene (PCE) and trichloroethylene (TCE), without considering other drinking water contaminants at Camp Lejeune such as benzene, vinyl chloride and mixtures of volatile organic compounds (VOCs). As noted in the very recent International Agency for Research on Cancer (IARC) Monograph Volume 100, benzene causes acute myologenous leukemia and is associated with other leukemias. The National Toxicology Program (NTP) Report on Carcinogens (ROC) reaches the same conclusion. Both reports reach a similar conclusion for vinyl chloride with regard to liver tumors. Both the IARC and the NTP label benzene and vinyl chloride as "known human carcinogens". The failure of the NRC Committee to consider these contaminants may lead one to conclude that the NRC findings of "*limited/suggestive evidence of an association*" pertains to all contaminants in the drinking water at Camp Lejeune. This conclusion would be incorrect based upon the evidence of the occurrence of these other exposures in Camp Lejeune drinking water. Thus, the review of cancer risks by the NRC was incomplete and only partially addressed concerns at Camp Lejeune. Finally, the NRC conclusions for PCE and TCE differ from the NTP and IARC which classify these chemicals as "probable human carcinogens" (IARC) or "reasonably anticipated to be a human carcinogen" (NTP) with various cancers including most notably kidney tumors.

Thus, let me be perfectly clear; there was undoubtedly a hazard associated with drinking the contaminated water at Camp Lejeune. The epidemiological studies and the associated exposure modeling will hopefully help us to decide on the level of risk associated with this hazard.

Although the availability of definitive reviews on other health endpoints besides cancer is limited, another shortcoming of the NRC review pertains to other health outcomes including adverse birth outcomes and immunotoxicity. In deciding what needed to be done to evaluate the potential health effects at Camp Lejeune, the ATSDR has taken all contaminants and all health outcomes into account and is acting accordingly.

ATSDR has studied the NRC report regarding the remaining issues. The use of the "lowest observed adverse effect level" (LOAEL) from animal studies without consideration of the uncertainties inherent in the LOAEL and the appropriateness of the use of this metric for assessing genotoxic cancer risks is a major shortcoming of the NRC report. Most regulatory agencies would either address the uncertainty in the LOAEL through the use of multiplicative factors to reduce the acceptable exposure or use an entirely different metric, such as the slope of the dose-response curve or a confidence bound around this curve, to arrive at values for comparison against environmental exposures. By doing neither, the NRC report suggests a much wider difference between exposure and effect than would normally be derived. In determining potential risks in order to develop power calculations for our epidemiological investigations, the ATSDR used the slope of the dose-response curve.

ATSDR disagrees with the NRC Committee's conclusion that the results of the water modeling for Tarawa Terrace were not sufficiently reliable to do dose characterization in the epidemiological studies. Modeling of the movement of contaminants through sub-surface water is a well established area of science and has been used on multiple occasions to address exposures in communities throughout the United States [reference: Anderson, MP. 1979. Using models to simulate the movement of contaminants through ground water flow systems. Critical Reviews in Environmental Control, 9(2): 97–156.] The state-of-the-art modeling being conducted by ATSDR shows sufficient concordance between the modeled PCE results and the actual measurements of PCE in the finished water at Tarawa Terrace to conclude that one could characterize exposure into several different groups. This conclusion is critical to the future epidemiological studies since it allows ATSDR to separate highly exposed individuals from individuals exposed to moderate and/or low exposures from the drinking water thus limiting exposure misclassification and the resulting bias in the direction of no effect on the study populations. Without these different classifications, ATSDR would need to rely on a simple grouping of exposed versus unexposed, severely limiting the utility of the epidemiological evaluations.

ATSDR agrees with the NRC report that, due to the complexity of the situation at Hadnot Point, alternative modeling strategies should be considered. We have addressed this issue in the current modeling activities and are moving forward with a strategy that will yield sufficiently reliable estimates for this complex exposure scenario.

ATSDR also agrees with the NRC recommendation that detailed plans for the statistical analyses should be and have been developed by ATSDR for the re-analysis of the adverse pregnancy outcome study and the birth defect/childhood cancer case-control study. ATSDR disagrees with the NRC that these studies should be completed as soon as possible; data analysis will not proceed until the drinking water modeling has been completed and is available for both Hadnot Point and Tarawa Terrace.

ATSDR disagrees with the NRC report's conclusion that the mortality study and the health survey/morbidity study lack sufficient statistical power and would be so limited by biases that they would not produce useful scientific information or be definitive. In the June 2008 ATSDR report Assessment of the Feasibility of Conducting Future Epidemiologic Studies at USMC Base Camp Lejeune, statistical power calculations were presented showing that the studies would have sufficient power for the cancers of interest, in particular, cancers associated with benzene, vinyl chloride, TCE or PCE exposure such as kidney cancer, non-

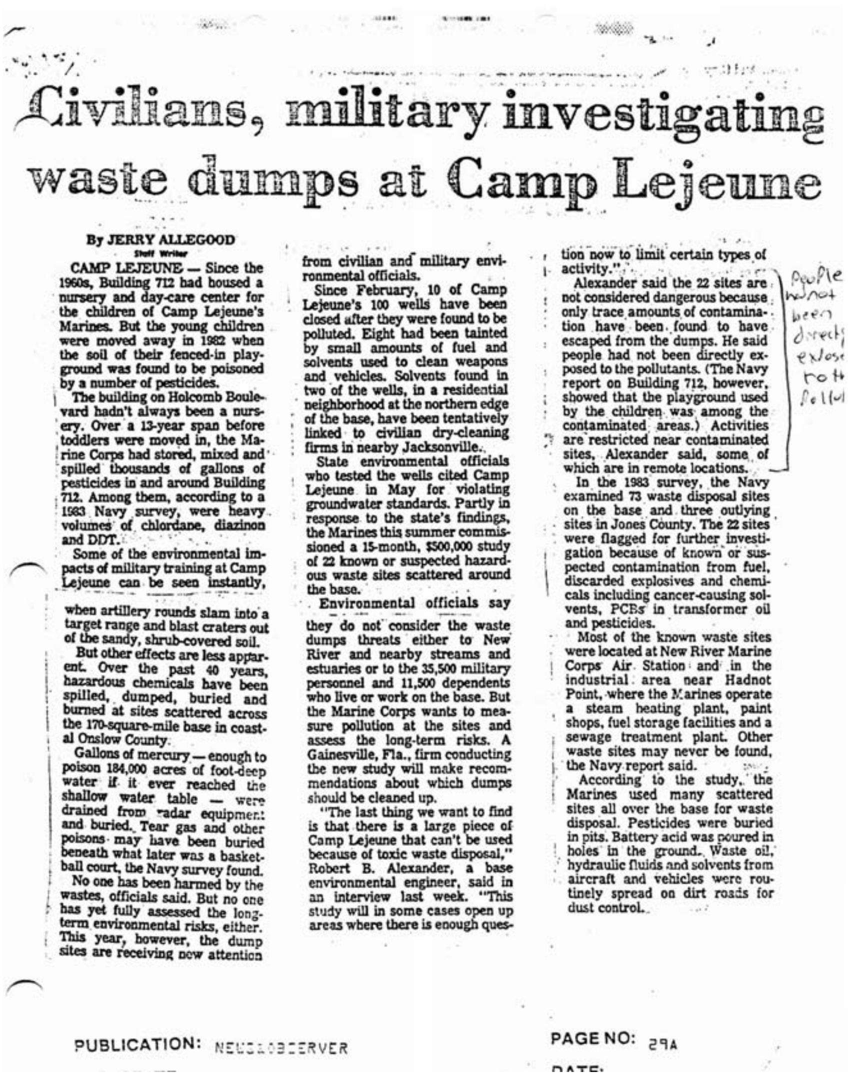
Hodgkin's lymphoma, leukemias, liver cancer, and esophageal cancer. Moreover, ATSDR emphasized that the studies would use standard research methodologies to minimize biases.

ATSDR is proceeding with the USMC Camp Lejeune Mortality Study and the Health Survey. ATSDR will establish a panel of experts to recommend adequate participation rates and consider potential biases in using the health survey for the follow-up morbidity study. We appreciate your financial support for these studies and your cooperation in the Data Discovery Technical Working Group. We are currently working on a request for additional FY 2011 funding requirements which should be completed soon.

Thank you again for your support.

Sincerely,

Christopher J. Portier, Ph.D.
Director, National Center for
Environmental Health, and
Agency for Toxic Substances and
Disease Registry



Civilians, military investigating waste dumps at Camp Lejeune

By JERRY ALLEGOOD
Staff Writer

CAMP LEJEUNE — Since the 1960s, Building 712 had housed a nursery and day-care center for the children of Camp Lejeune's Marines. But the young children were moved away in 1982 when the soil of their fenced-in playground was found to be poisoned by a number of pesticides.

The building on Holcomb Boulevard hadn't always been a nursery. Over a 13-year span before toddlers were moved in, the Marine Corps had stored, mixed and spilled thousands of gallons of pesticides in and around Building 712. Among them, according to a 1983 Navy survey, were heavy volumes of chlordane, diazinon and DDT.

Some of the environmental impacts of military training at Camp Lejeune can be seen instantly, when artillery rounds slam into a target range and blast craters out of the sandy, shrub-covered soil.

But other effects are less apparent. Over the past 40 years, hazardous chemicals have been spilled, dumped, buried and burned at sites scattered across the 170-square-mile base in coastal Onslow County.

Gallons of mercury — enough to poison 184,000 acres of foot-deep water if it ever reached the shallow water table — were drained from radar equipment and buried. Tear gas and other poisons may have been buried beneath what later was a basketball court, the Navy survey found.

No one has been harmed by the wastes, officials said. But no one has yet fully assessed the long-term environmental risks, either. This year, however, the dump sites are receiving new attention from civilian and military environmental officials.

Since February, 10 of Camp Lejeune's 100 wells have been closed after they were found to be polluted. Eight had been tainted by small amounts of fuel and solvents used to clean weapons and vehicles. Solvents found in two of the wells, in a residential neighborhood at the northern edge of the base, have been tentatively linked to civilian dry-cleaning firms in nearby Jacksonville.

State environmental officials who tested the wells cited Camp Lejeune in May for violating groundwater standards. Partly in response to the state's findings, the Marines this summer commissioned a 15-month, $500,000 study of 22 known or suspected hazardous waste sites scattered around the base.

Environmental officials say they do not consider the waste dumps threats either to New River and nearby streams and estuaries or to the 35,500 military personnel and 11,500 dependents who live or work on the base. But the Marine Corps wants to measure pollution at the sites and assess the long-term risks. A Gainesville, Fla., firm conducting the new study will make recommendations about which dumps should be cleaned up.

"The last thing we want to find is that there is a large piece of Camp Lejeune that can't be used because of toxic waste disposal," Robert B. Alexander, a base environmental engineer, said in an interview last week. "This study will in some cases open up areas where there is enough question now to limit certain types of activity."

Alexander said the 22 sites are not considered dangerous because only trace amounts of contamination have been found to have escaped from the dumps. He said people had not been directly exposed to the pollutants. (The Navy report on Building 712, however, showed that the playground used by the children was among the contaminated areas.) Activities are restricted near contaminated sites, Alexander said, some of which are in remote locations.

People had not been directly expose to th pollu

In the 1983 survey, the Navy examined 73 waste disposal sites on the base and three outlying sites in Jones County. The 22 sites were flagged for further investigation because of known or suspected contamination from fuel, discarded explosives and chemicals including cancer-causing solvents, PCBs in transformer oil and pesticides.

Most of the known waste sites were located at New River Marine Corps Air Station and in the industrial area near Hadnot Point, where the Marines operate a steam heating plant, paint shops, fuel storage facilities and a sewage treatment plant. Other waste sites may never be found, the Navy report said.

According to the study, the Marines used many scattered sites all over the base for waste disposal. Pesticides were buried in pits. Battery acid was poured in holes in the ground. Waste oil, hydraulic fluids and solvents from aircraft and vehicles were routinely spread on dirt roads for dust control.

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PAGE NO: 29A

DATE:

State, federal and military environmental officials said in separate interviews that the practices occurred before the mid-1970s, when environmental laws and controls on the handling of chemical waste were implemented. Solid and hazardous wastes on base are now regulated by the N.C. Department of Human Resources. Under a permit issued in September 1984, the Marine Corps is permitted temporarily to store waste from Camp Lejeune operations until it is shipped to South Carolina for permanent disposal.

Alexander said the Marine Corps in recent years has added millions of dollars worth of pollution abatement facilities, and waste material is now recycled or disposed of properly. He added that Marines receive regular training on proper waste disposal.

"The causes of these problems really aren't there any more," be said.

Wayne Mathis, an environmental engineer with the U.S. Environmental Protection Agency in Atlanta, Ga., said Camp Lejeune's past practices and its problems were neither unique nor alarming. He compared the base to a medium-sized city that would generate waste from residents, vehicle maintenance and industries.

"They would have a little of a lot of things rather than a lot of any one thing," he said.

Arthur E. Linton, federal facilities coordinator for the EPA's southeast region in Atlanta, said Camp Lejeune and other military installations had disposed of waste in ways that were accepted practices in the past.

"The military hasn't done anything that wasn't done in the private sector," he said.

He said the contamination at Camp Lejeune is not as bad as cases at other military bases in other states involving larger amounts of chemicals and incidents where pesticides have contaminated drinking water. The EPA has proposed that four military installations — one in Tennessee, two in Alabama and one in Georgia — receive top priority for a cleanup effort by the Pentagon.

Linton said the most serious problem at Camp Lejeune was contamination of groundwater with solvents that are suspected of causing cancer. The solvents are commonly used for a number of purposes, including cleaning metal and engine parts.

Ground water solvents

State records indicate that water samples taken from the 10 Camp Lejeune wells that were closed since February contained varying amounts of nine chemicals.

The Marines first found contaminants in the wells last year and informed the state, saidspokesmen for the Marine Corps and the state. State testing confirmed the contamination, and the 10 wells all had been closed when, in May, the N.C. Department of Natural Resources and Community Development informed Marine officials that they had violated groundwater standards. The state said the Marines would have to take corrective measures.

In reply two months later, the Marines said they already had decided to commission the new 15-month study to assess hazardous wastes on the base and also to pinpoint the sources of the well pollutants.

Charles E. Rundgren, head of the state's water supply branch, said the wells had been plugged shortly after they became contaminated. The amount of chemicals found were not a threat to people who had been drinking the water during that short period, he said. The water would not cause someone to become ill from drinking it, he said, but ill effects could result from long-term exposure.

H. Lee Mittelstadt, spokeswoman for the state Solid and Hazardous Waste Branch, said state officials felt Camp Lejeune was taking "adequate steps to protect (people) from possible exposure to the contaminants" by closing down the wells.

She added that contamination from the 22 sites was a potential problem but not an immediate threat because the locations were known and monitoring could detect future trouble.

Camp Lejeune authorities in May notified base residents and water customers of the contaminants with leaflets and articles in the base newspaper. Officials said that after the 10 wells were closed, the base water system was able to provide water from other sources not affected by contaminants.

An NRCD report said contaminants were found in eight wells in the Hadnot Point system and two wells at Tarawa Terrace, a residential area. Some hazardous waste sites pinpointed in the 1983 study are located near the industrial area but none are located at Tarawa Terrace.

Alexander said there is no clear relationship between the closing of the wells and any specific waste site.

well 602

"The way we got onto the well problem was in sampling near one of our fuel farms," or fuel storage facilities, he said. "We sampled nearby wells. In one near the fuel farm, we didn't detect fuel but did detect organic solvents."

In its response to the NRCD notice of violation, the Marine Corps said 50 to 70 shallow would be drilled to test groundwater, and the soil near suspected disposal sites would be tested for the presence of chemicals.

Col. R.A. Tiebout, Camp Lejeune's assistant chief of staff for facilities, characterized all of the actions so far — closing wells, relocating the day-care center and extensive testing — as precautionary measures.

"We're going to do everything to make water, air and land as pure as possible," he said.

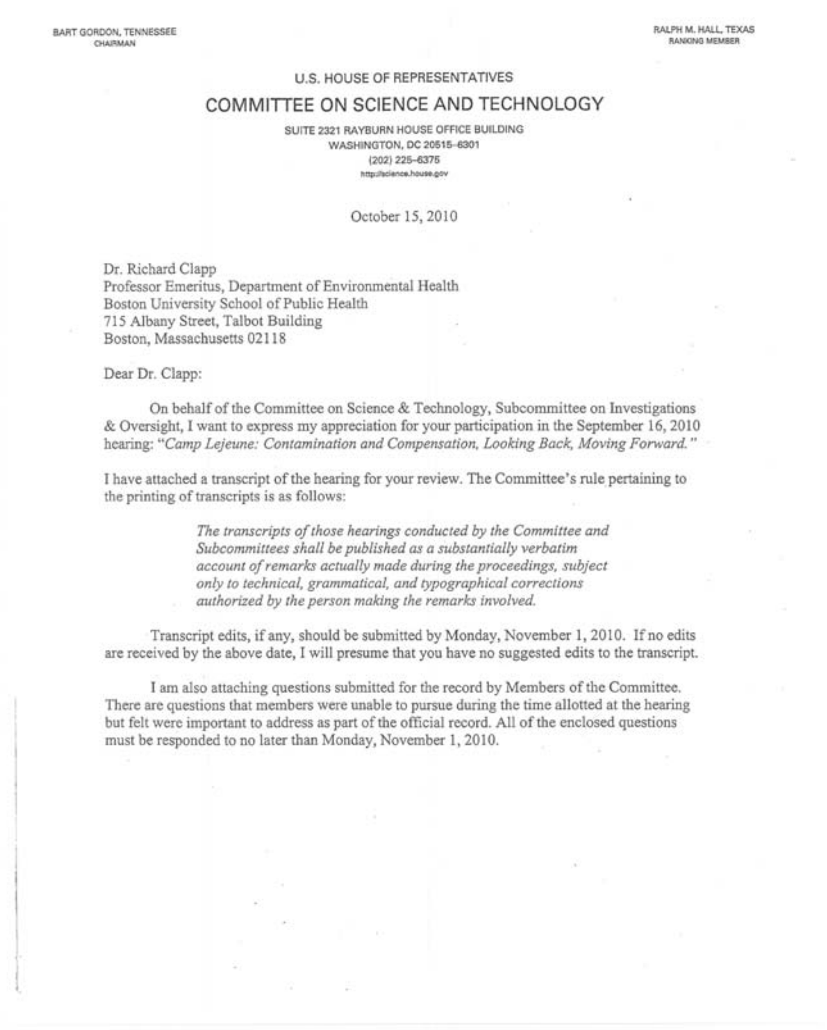
Minimization of Exposure by State of N.C.

PUBLICATION: NEWS&OBSERVER

CITY/STATE: RALEIGH,N.C.

PAGE NO: 29A(cont.)

DATE: 15SEPT.85



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October 15, 2010

Dr. Richard Clapp
Professor Emeritus, Department of Environmental Health
Boston University School of Public Health
715 Albany Street, Talbot Building
Boston, Massachusetts 02118

Dear Dr. Clapp:

On behalf of the Committee on Science & Technology, Subcommittee on Investigations & Oversight, I want to express my appreciation for your participation in the September 16, 2010 hearing: "*Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward.*"

I have attached a transcript of the hearing for your review. The Committee's rule pertaining to the printing of transcripts is as follows:

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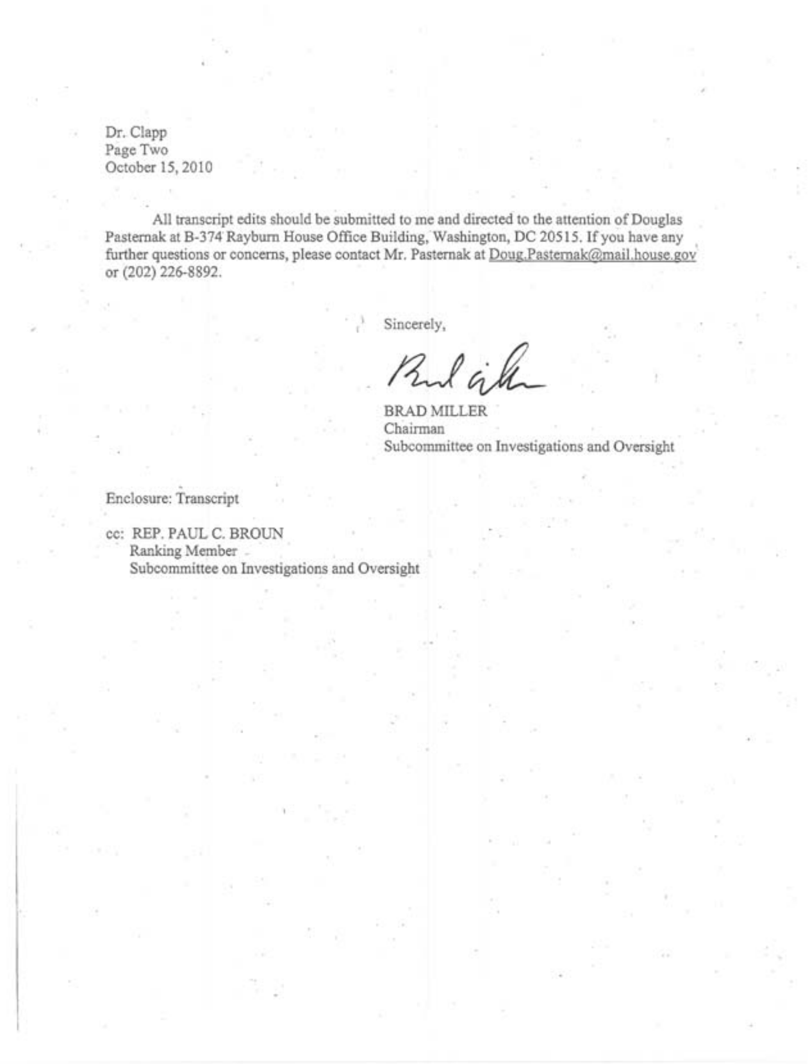

Dr. Clapp
Page Two
October 15, 2010

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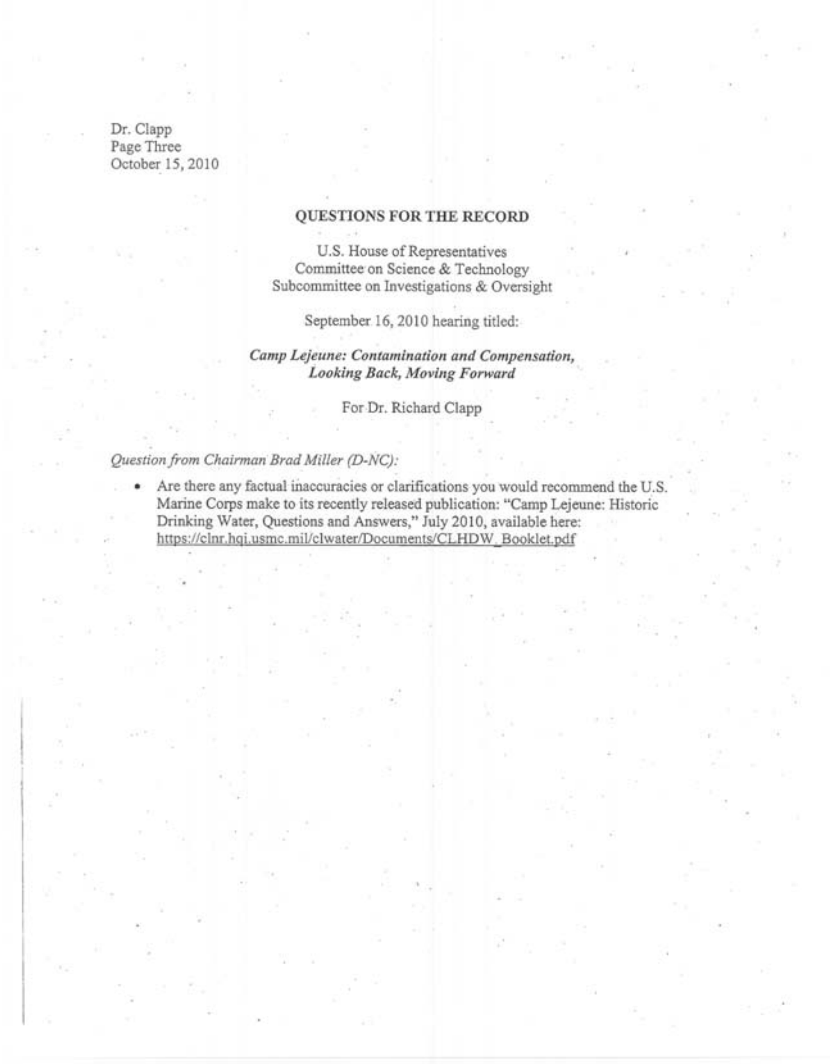
Sincerely,

BRAD MILLER
Chairman
Subcommittee on Investigations and Oversight

Enclosure: Transcript

cc: REP. PAUL C. BROUN
Ranking Member
Subcommittee on Investigations and Oversight



Dr. Clapp
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October 15, 2010

QUESTIONS FOR THE RECORD

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

September 16, 2010 hearing titled:

Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward

For Dr. Richard Clapp

Question from Chairman Brad Miller (D-NC):

- Are there any factual inaccuracies or clarifications you would recommend the U.S. Marine Corps make to its recently released publication: "Camp Lejeune: Historic Drinking Water, Questions and Answers," July 2010, available here: https://clnr.hqi.usmc.mil/clwater/Documents/CLHDW_Booklet.pdf

ANSWERS TO POST-HEARING QUESTIONS

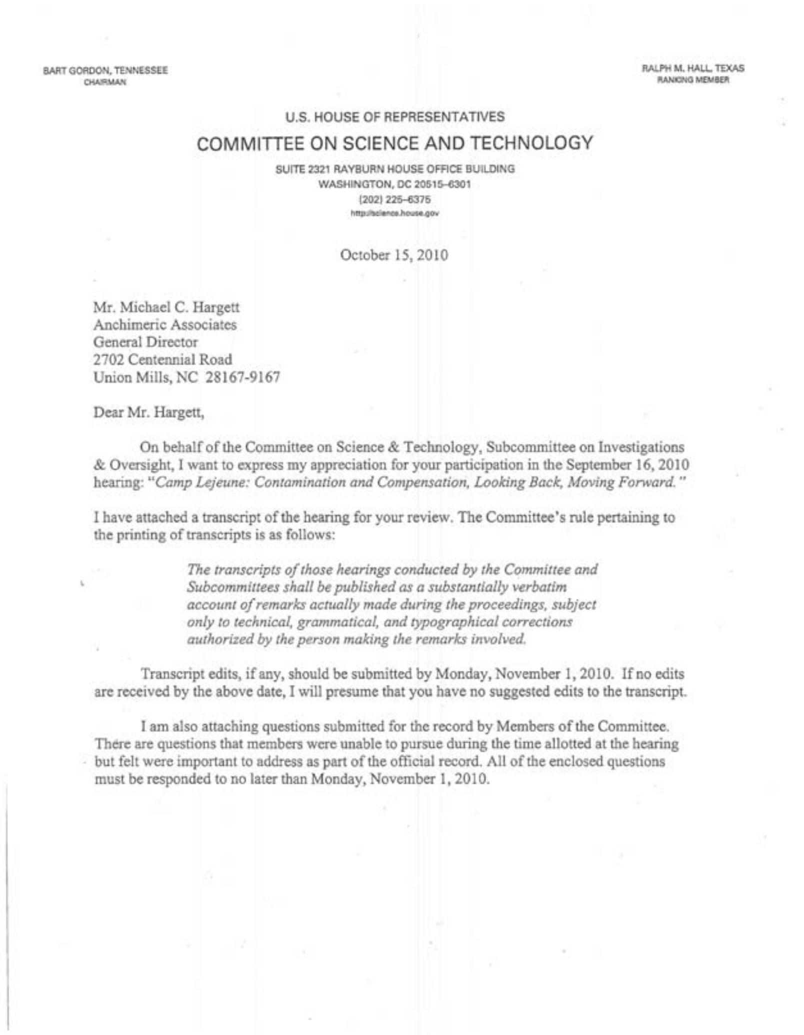
Responses by Dr. Richard Clapp, Professor Emeritus, Department of Environmental Health, Boston University School of Public Health, Environmental Health Policy Consultant and Member of the ATSDR Camp Lejeune Community Assistant Panel (CAP)

Questions submitted by Chairman Brad Miller

Q1. Are there any factual inaccuracies or clarifications you would recommend the U.S. Marine Corps make to its recently released publication: "Camp Lejeune: Historic Drinking Water, Questions and Answers," July 2010, available here: https://clnr.hqi.usmc.mil/clwater/Documents/CLHDW_Booklet.pdf

A1. In that regard, I note that the cover letter by Commandant Conway says "the scientific community has not established an association between exposure to the contaminated water and health conditions reported by former residents of Camp Lejeune," and the text of the booklet on page eight says "studies to date have not shown any causal link between exposure to contaminated water at Camp Lejeune and illnesses," and "At this time, scientific studies have not linked exposure to the impacted drinking water at Camp Lejeune to any illnesses." As I said in my testimony, the Camp Lejeune health studies are not complete but there is considerable literature about the health effects of these contaminants and adverse health outcomes. For example, the Woburn, Massachusetts drinking water contaminated with TCE and PCE has been statistically linked to childhood leukemia in two published studies. (see Lagakos, et al., 1986 and Costas, et al., 2002) I think the Marine Corps booklet should acknowledge these other studies, since the ATSDR studies of Camp Lejeune illnesses are not completed yet.

The booklet also says in the timeline entry for 1982 on p. 7, "Base officials determine that sampling results were within Environmental Protection Agency (EPA) recommended levels." I do not have the EPA documentation for 1982 readily available, but from my experience in Massachusetts at that time, I know that the Woburn wells contaminated with TCE (267 ppb) and PCE (21 ppb) were considered above acceptable levels and shut off in 1979. This should be clarified in the booklet. I believe another expert who testified at the September 16 hearing can comment on a statement on p. 4 of the booklet that "Once identified, the impacted wells were promptly taken out of service." It is my understanding that there was a considerable delay in shutting off Well 602, but I would defer to Mr. Hargett on this specific issue.



BART GORDON, TENNESSEE
CHAIRMAN

RALPH M. HALL, TEXAS
RANKING MEMBER

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515–6301
(202) 225–6375
http://science.house.gov

October 15, 2010

Mr. Michael C. Hargett
Anchimeric Associates
General Director
2702 Centennial Road
Union Mills, NC 28167-9167

Dear Mr. Hargett,

On behalf of the Committee on Science & Technology, Subcommittee on Investigations & Oversight, I want to express my appreciation for your participation in the September 16, 2010 hearing: "*Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward.*"

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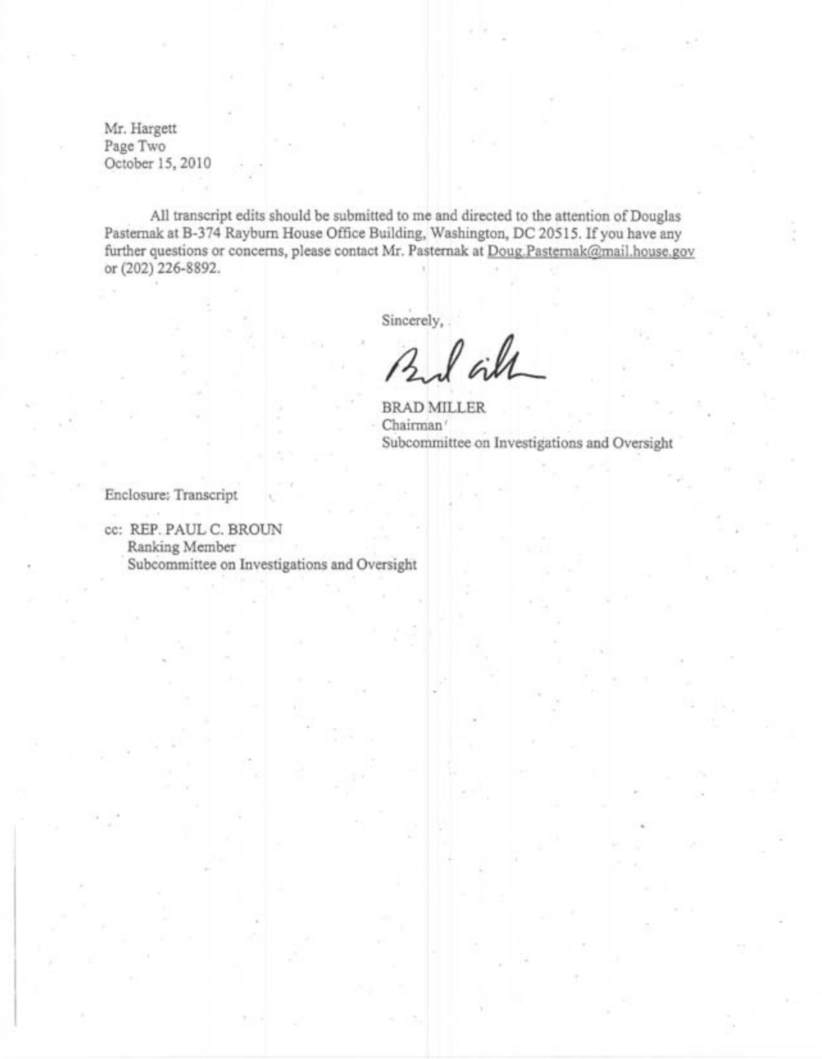

Mr. Hargett
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Subcommittee on Investigations and Oversight

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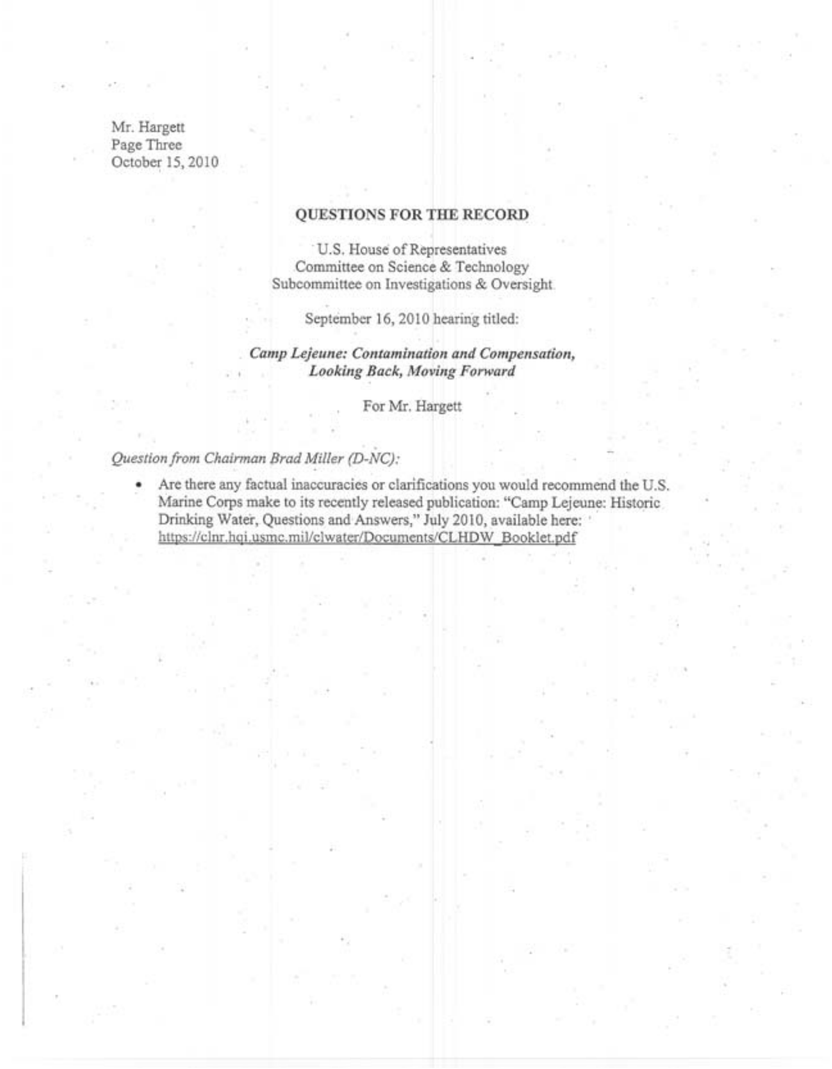

Mr. Hargett
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October 15, 2010

QUESTIONS FOR THE RECORD

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

September 16, 2010 hearing titled:

Camp Lejeune: Contamination and Compensation,
Looking Back, Moving Forward

For Mr. Hargett

Question from Chairman Brad Miller (D-NC):

- Are there any factual inaccuracies or clarifications you would recommend the U.S. Marine Corps make to its recently released publication: "Camp Lejeune: Historic Drinking Water, Questions and Answers," July 2010, available here: https://clnr.hqi.usmc.mil/clwater/Documents/CLHDW_Booklet.pdf

ANSWERS TO POST-HEARING QUESTIONS

Responses by Mr. Michael Hargett, General Director, Anchimeric Associates and Former Co-Owner of Grainger Laboratories

Questions submitted by Chairman Brad Miller

Q1. Are there any factual inaccuracies or clarifications you would recommend the U.S. Marine Corps make to its recently released publication: "Camp Lejeune: Historic Drinking Water, Questions and Answers," July 2010, available here: https://clnr.hqi.usmc.mil/clwater/Documents/CLHDW_Booklet.pdf

A1. 1) Presentation of "chemicals" in the drinking water is somewhat naive and reflects a poor understanding of the problem to be addressed and common utility communications for water systems.

In chemistry, a chemical substance is a material with a specific chemical composition.

A common example of a chemical substance is pure water; it has the same properties and the same ratio of hydrogen to oxygen whether it is isolated from a river or made in a laboratory. Some typical chemical substances are diamond, gold, salt (sodium chloride) and sugar (sucrose). Generally, chemical substances exist as a solid, liquid, gas, or plasma and may change between these phases of matter with changes in temperature or pressure. Chemical reactions convert one chemical substance into another.

Chemical substances (also sometimes referred to as a pure substance) are often defined as "any material with a definite chemical composition" in most introductory general chemistry textbooks. According to this definition a chemical substance can either be a pure chemical element or a pure chemical compound. But, there are exceptions to this definition; a pure substance can also be defined as a form of matter that has both definite composition and distinct properties. The chemical substance index published by CAS also includes several alloys of uncertain composition.

Non-stoichiometric compounds are a special case (in inorganic chemistry) that violates the law of constant composition, and for them, it is sometimes difficult to draw the line between a mixture and a compound, as in the case of palladium hydride. Broader definitions of chemicals or chemical substances can be found, for example: "the term 'chemical substance' means any organic or inorganic substance of a particular molecular identity, including—any combination of such substances occurring in whole or in part as a result of a chemical reaction or occurring in nature"

The correct expression would be a reference to contaminants.

2) The statement that the "groundwater" was the source of the contaminants is absurd. ALL drinking water at the base is groundwater.

3) The drinking water at the base was subject to the Safe Drinking Water Act (Public Law 93–523) as early as 1981 when primacy for enforcement of the act was assumed by the State of North Carolina and the grace period provided by EPA and Congress for compliance expired.

This is why, when informed by regional engineers for the Water Supply Branch for the State of North Carolina, Camp LeJeune contracted with Grainger Laboratories for water analyses that were consistent with certification requirements of the ACt. This is referenced in the purchase order from the base to Grainger Laboratories.

In 1974 Congress enacted the Safe Drinking Water Act (SDWA) (P.L. 93–523, 88 Stat. 1660) to protect the quality of both actual and potential drinking water in the United States. Congress had created the SDWA in response to a nationwide survey that revealed health risks from inadequate public water-supply facilities, polluted supplies, and operating procedures that did not achieve a safe water quality. To achieve its goal the SDWA provides water quality standards for drinking-water suppliers, protects underground drinking-water sources, and directs appropriate deep-well injection of wastes.

The SDWA requires the U.S. Environmental Protection Agency (EPA) to regulate all "public water systems," defined as systems that provide piped water for human consumption for at least sixty days a year to at least fifteen service connections or twenty-five people. The EPA does this through Primary Drinking Water Regulations, by which it first identifies contaminants that may pose a risk to human health and that occur in drinking water at potentially unsafe levels. Then the EPA specifies a Maximum Contaminant Level Goal (MCLG) for each contaminant, which is set at the level below which there is no predicted health risk. Finally the EPA creates a legally enforceable Maximum Contaminant Level (MCL), which is the greatest amount of contaminant that will be allowed in the public water supply.

This MCL must be set as close as is feasible to the MCLG after taking into account the best technology, treatment techniques, and costs. Since the 1996 amendments discussed below, the EPA may instead require a Treatment Technique for removing the contaminant if there is neither an economically or technologically feasible MCL, nor an accurate way to measure the contaminant in water.

4) The contaminated wells were not immediately shutdown as claimed by the USMC as evidenced by the continuation of sampling and consultations with base personnel for corrective actions.

5) Public communications (as prescribed in PL 93–523 and detailed in EPA advisories and communications at the time) were not initiated until 7 years later after additional events had occurred to further contaminate the groundwater.

6) The brochure does not address the high levels of Trihalomethanes noted in the drinking water or the corrective actions initiated to lower the levels of this carcinogen.

7) The statement that ". . . The ability to test for various chemicals in drinking water and requirements to conduct such testing were evolving through the late 1970s and early 1980s . . .", is misleading and incomplete in fact the contaminants of interest had well established analytical methods for drinking water as early as the 1950s and were used by US Government agencies for similar evaluation and contaminant source identification.

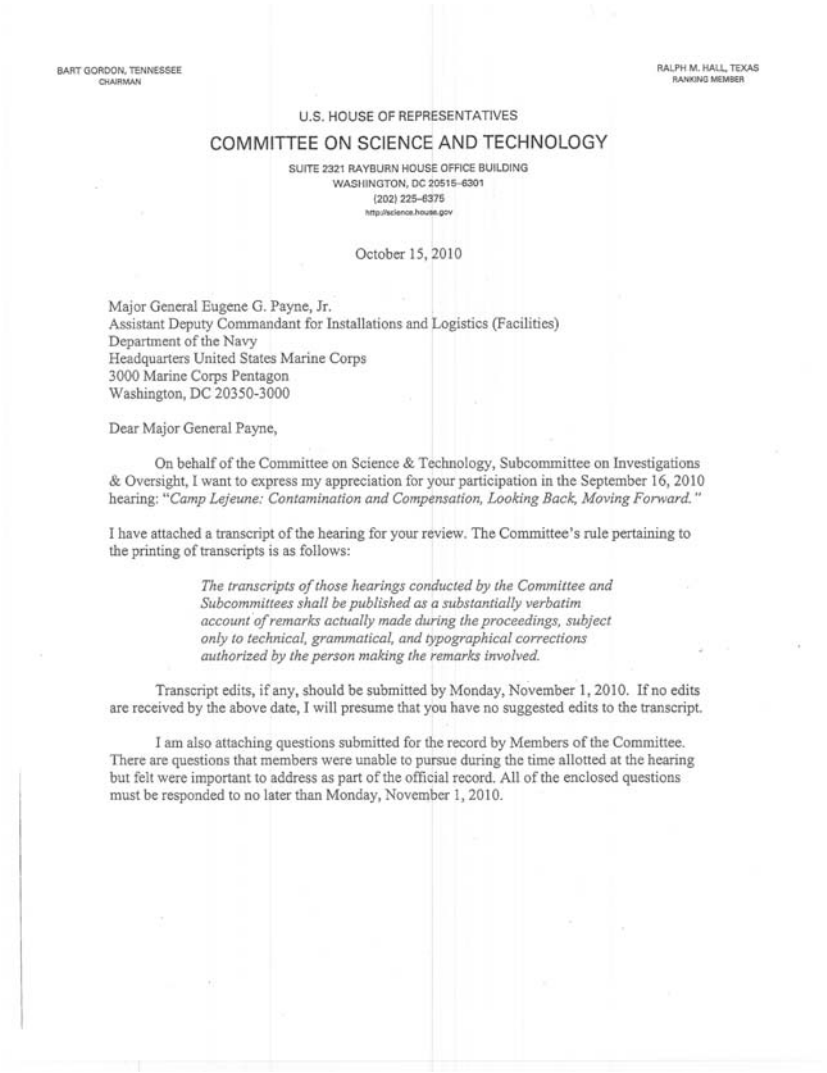
8) The health effects of chlorinated solvents was well established in the 1960s and 1970s and the basis of warning to the base in 1982 and 1983 was based on known health impacts. The statement referencing the absence of regulatory limits in the SDWA at that time is irresponsible and without merit.

9) As indicated in my testimony, the motivation for discussion and further corrective actions were based on the hazards associated with continuing exposure.

10) The USMC demonstrated gross negligence under the SDWA in 1983–1987 in a failure to seek resolution of a clearly defined and communicated peril to base occupants and workers.

My opinion is this document was written by a contractor with poor understanding of the SDWA and water utility industry operations. The brochure is defensive and lacks objectivity and an honest exchange of meaningful communications.

Please feel free to contact me if there are further questions where I can assist.



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October 15, 2010

Major General Eugene G. Payne, Jr.
Assistant Deputy Commandant for Installations and Logistics (Facilities)
Department of the Navy
Headquarters United States Marine Corps
3000 Marine Corps Pentagon
Washington, DC 20350-3000

Dear Major General Payne,

On behalf of the Committee on Science & Technology, Subcommittee on Investigations & Oversight, I want to express my appreciation for your participation in the September 16, 2010 hearing: "*Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward.*"

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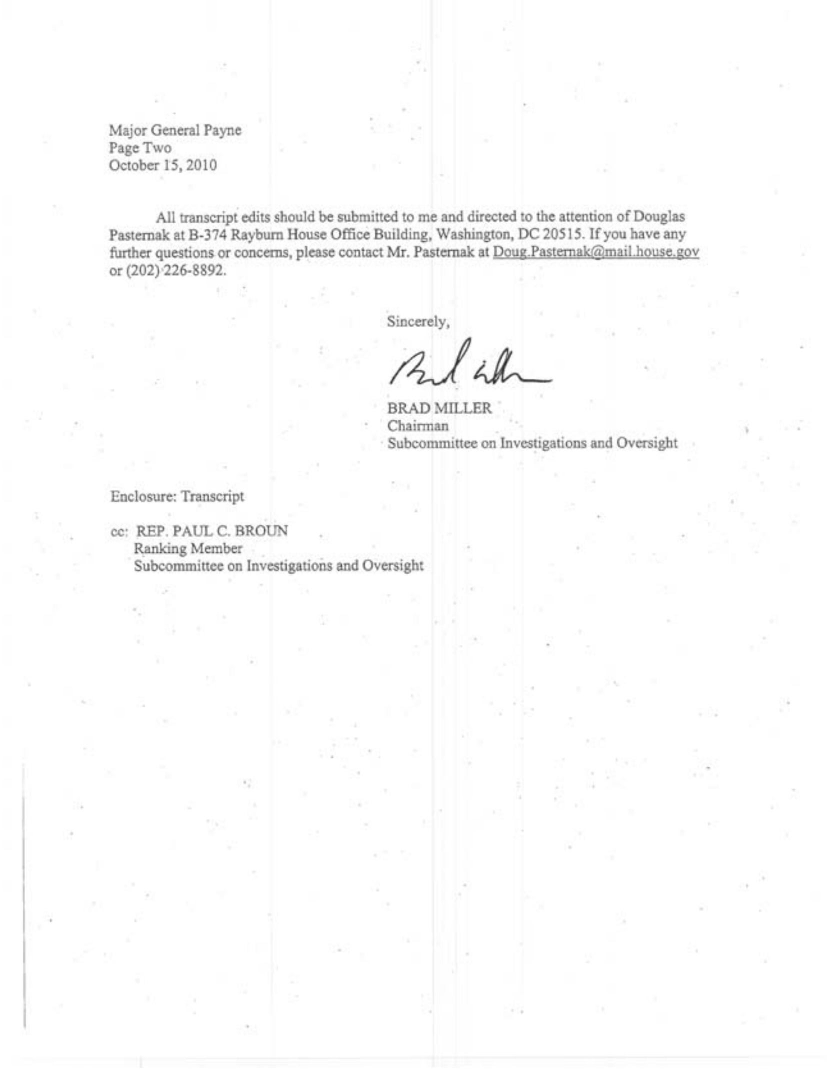

Major General Payne
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Chairman
Subcommittee on Investigations and Oversight

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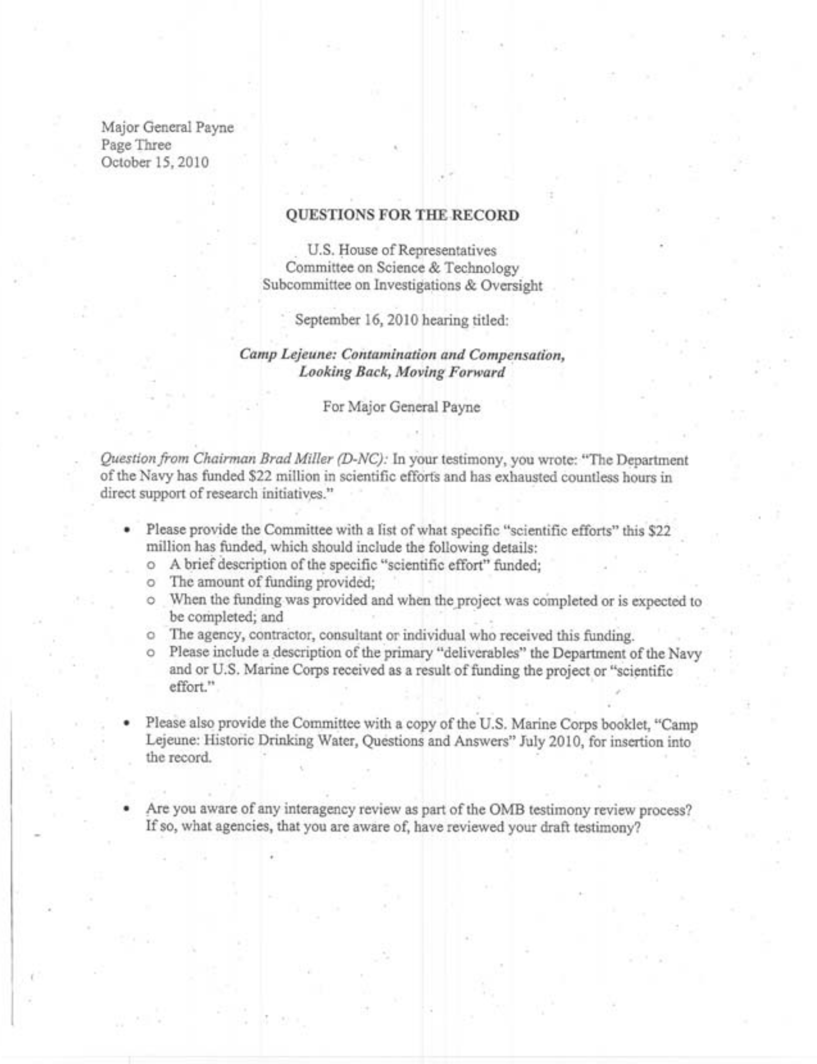

Major General Payne
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October 15, 2010

QUESTIONS FOR THE RECORD

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

September 16, 2010 hearing titled:

Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward

For Major General Payne

Question from Chairman Brad Miller (D-NC): In your testimony, you wrote: "The Department of the Navy has funded $22 million in scientific efforts and has exhausted countless hours in direct support of research initiatives."

- Please provide the Committee with a list of what specific "scientific efforts" this $22 million has funded, which should include the following details:
  - A brief description of the specific "scientific effort" funded;
  - The amount of funding provided;
  - When the funding was provided and when the project was completed or is expected to be completed; and
  - The agency, contractor, consultant or individual who received this funding.
  - Please include a description of the primary "deliverables" the Department of the Navy and or U.S. Marine Corps received as a result of funding the project or "scientific effort."

- Please also provide the Committee with a copy of the U.S. Marine Corps booklet, "Camp Lejeune: Historic Drinking Water, Questions and Answers" July 2010, for insertion into the record.

- Are you aware of any interagency review as part of the OMB testimony review process? If so, what agencies, that you are aware of, have reviewed your draft testimony?

ANSWERS TO POST-HEARING QUESTIONS

Responses by Major General Eugene G. Payne, Jr., Assistant Deputy Commandant for Installations and Logistics (Facilities), Headquarters, United States Marine Corps

Questions submitted by Chairman Brad Miller

Q1. Please provide the Committee with a list of what specific "scientific efforts" this $22 million has funded, which should include the following details:

- *a. A brief description of the specific "scientific effort" funded;*
- *b. The amount of funding provided;*
- *c. When the funding was provided and when the,project was completed or is expected to be completed; and*
- *d. The agency, contractor, consultant or individual who received this funding.*
- *e. Please include a description of the primary "deliverables" the Department of the Navy and or U.S. Marine Corps received as a result of funding the project or "scientific effort."*

A1a. The scientific efforts include:

- Health studies and initiatives conducted by the Agency for Toxic Substances and Disease Registry (ATSDR). These studies and initiatives include:
  - i. A Public Health Assessment (1997).
  - ii. An Adverse Pregnancy Outcomes Study (1998).
  - iii. A National Survey of Children who were born at Camp Lejeune 1968–1985 (2001).
  - iv. A Birth Defects and Childhood Cancer Study (Ongoing).
  - v. Historic Water Modeling Dose Exposure Reconstruction (Ongoing).
  - vi. Community Assistance Panel Meetings (Ongoing).
  - vii. Congressionally Mandated Health Survey (Ongoing).
  - viii. Mortality Study (Ongoing).
  - ix. Cancer Incidence Study (Ongoing).
- A review by the National Academies National Research Council (NRC) on the scientific evidence on associations between adverse health effects and historical data on prenatal, childhood, and adult exposures to contaminated drinking water at Camp Lejeune.

A1b. The Department of the Navy (DON) has provided ATSDR approximately $21.7 million between Fiscal Year (FY) 1997 and FY2010. The DON provided NRC with $0.948 million for their review. In addition, prior to the release of the results of NRC's review, DON provided the NRC with $0.600 million to do potential follow-on reports. To date, the DON has not tasked the NRC to do any follow-on reports.

A1c. ATSDR is the appropriate party to provide these answers. However, regarding ATSDR's work, please find enclosed with this response, for reference, copies of the Annual Plans of Work negotiated between DON and ATSDR for FY 2000–2010. These provide information on ATSDR's planned work and the funding provided by FY. Questions regarding ATSDR study completion dates should be directed to ATSDR.

Regarding the NRC review, DON provided $0.850 million in FY07 and $0.098 million in FY08. This project is complete. In addition, prior to the release of the NRC report in June 2009, DON provided the NRC with $0.600 million in FY09 funds for any necessary follow-on reports. To date, NRC has not been tasked to do any follow-on reports.

A1d. DoN funding for these efforts were provided directly to ATSDR and the NRC. Questions regarding any contractors, consultants or individuals that they may have used as part of the studies should be directed to these organizations.

A1e. At present, there is one published ATSDR health study concerning Camp Lejeune, a 1998 Adverse Pregnancy Outcomes Study that looked at birth weights of children born at Camp Lejeune. However, we have been advised that ATSDR plans to reevaluate this study. ATSDR also published a Public Health Assessment (PHA) in 1997 evaluating the risk to human health and the environment from hazardous waste sites but it was later withdrawn from ATSDR's website for reevaluation. PHAs are conducted by ATSDR for all National Priorities List installations.

Questions regarding interim reports on ongoing ATSDR health studies should be directed to ATSDR.

The DoN received a report from the NRC in June 2009, "Contaminated Water Supplies at Camp Lejeune, Assessing Potential Health Effects." In the report, the committee assessed the strength of evidence in establishing a link or association between exposure to trichloroethylene, tetrachloroethylene, and other contaminants and each adverse health effect suspected to be associated with such exposure.

Q2. Please also provide the Committee with a copy of the U.S. Marine Corps booklet, "Camp Lejeune: Historic Drinking Water, Questions and Answers" July 2010, for insertion into the record.

A2. U. S. Marine Corps' Camp Lejeune Historic Drinking Water booklet attached (enclosure 1).[2]

Q3. Are you aware of any interagency review as part of the OMB testimony review process? If so, what agencies, that you are aware of, have reviewed your draft testimony?

A3. As the lead agency for interagency testimony review, OMB is the appropriate agency to provide information about what agencies were involved in the OMB testimony review process.

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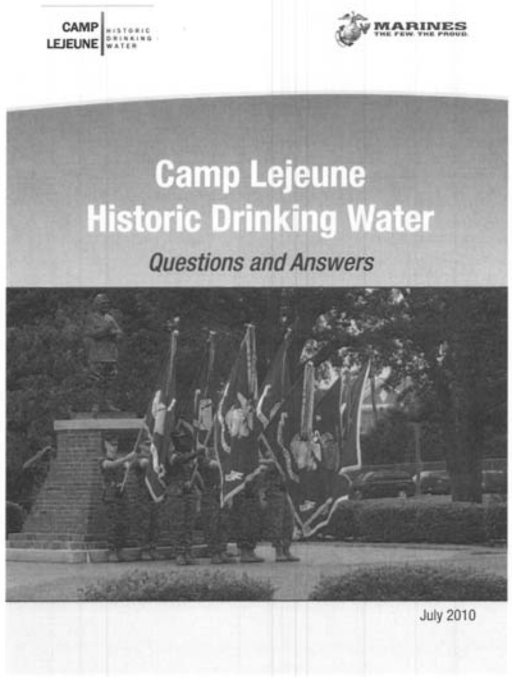
[2] *https://clnr.hqi.usmc.mil/clwater/Documents/CLHDW_Booklet.pdf*



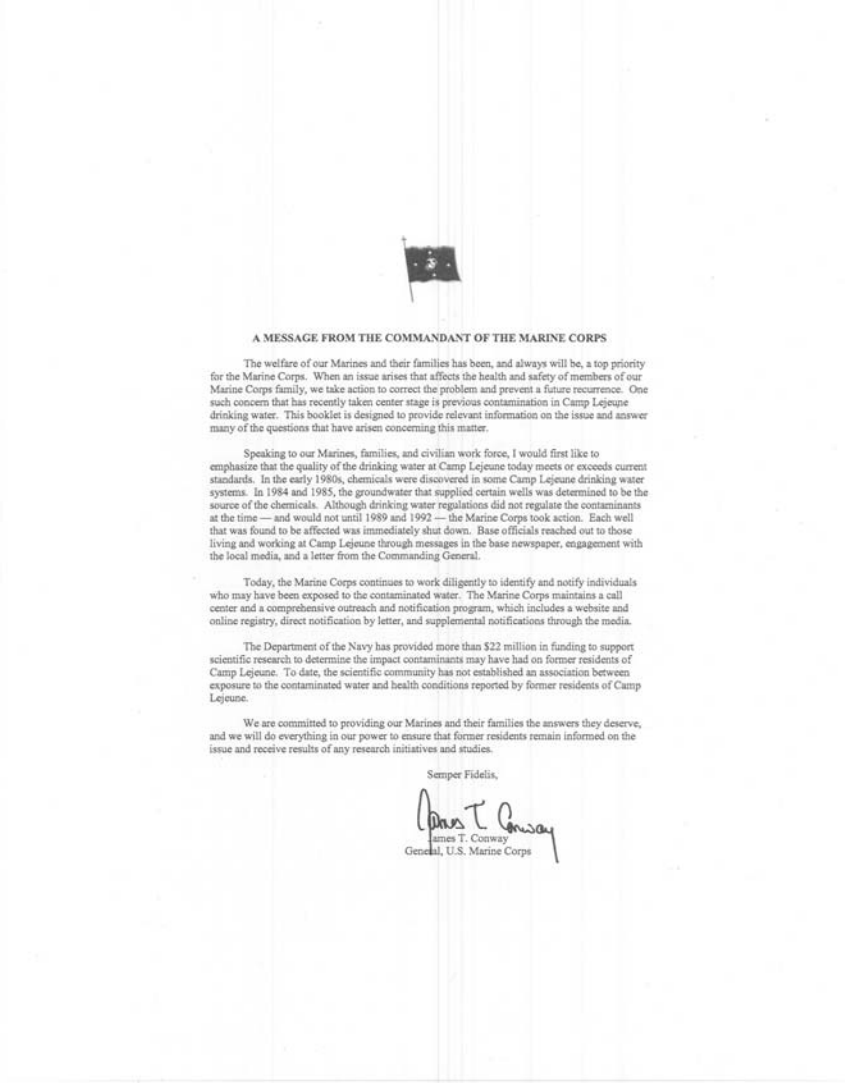
CAMP LEJEUNE | HISTORIC DRINKING WATER

MARINES
THE FEW. THE PROUD.

Camp Lejeune Historic Drinking Water

Questions and Answers

July 2010



A MESSAGE FROM THE COMMANDANT OF THE MARINE CORPS

The welfare of our Marines and their families has been, and always will be, a top priority for the Marine Corps. When an issue arises that affects the health and safety of members of our Marine Corps family, we take action to correct the problem and prevent a future recurrence. One such concern that has recently taken center stage is previous contamination in Camp Lejeune drinking water. This booklet is designed to provide relevant information on the issue and answer many of the questions that have arisen concerning this matter.

Speaking to our Marines, families, and civilian work force, I would first like to emphasize that the quality of the drinking water at Camp Lejeune today meets or exceeds current standards. In the early 1980s, chemicals were discovered in some Camp Lejeune drinking water systems. In 1984 and 1985, the groundwater that supplied certain wells was determined to be the source of the chemicals. Although drinking water regulations did not regulate the contaminants at the time — and would not until 1989 and 1992 — the Marine Corps took action. Each well that was found to be affected was immediately shut down. Base officials reached out to those living and working at Camp Lejeune through messages in the base newspaper, engagement with the local media, and a letter from the Commanding General.

Today, the Marine Corps continues to work diligently to identify and notify individuals who may have been exposed to the contaminated water. The Marine Corps maintains a call center and a comprehensive outreach and notification program, which includes a website and online registry, direct notification by letter, and supplemental notifications through the media.

The Department of the Navy has provided more than $22 million in funding to support scientific research to determine the impact contaminants may have had on former residents of Camp Lejeune. To date, the scientific community has not established an association between exposure to the contaminated water and health conditions reported by former residents of Camp Lejeune.

We are committed to providing our Marines and their families the answers they deserve, and we will do everything in our power to ensure that former residents remain informed on the issue and receive results of any research initiatives and studies.

Semper Fidelis,

James T. Conway

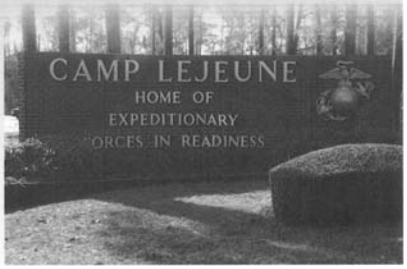
James T. Conway
General, U.S. Marine Corps

Marine Corps Base (MCB) Camp Lejeune is located in Jacksonville, North Carolina within Onslow County. The community is home to an active duty, dependent, retiree and civilian employee population of more than 165,000 people. The Base is a major economic presence for the surrounding community and maintains a close relationship to ensure quality living for both military and civilians throughout the area.

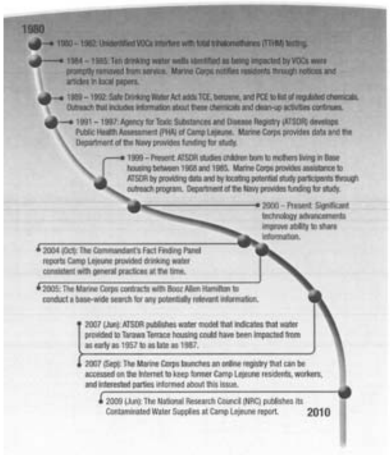
MCB Camp Lejeune's mission is to maintain combat-ready units for expeditionary deployment. To help prepare warfighters for combat and humanitarian missions abroad, MCB Camp Lejeune utilizes 236 square miles or 156,000 acres, including 11 miles of beach capable of supporting amphibious operations, 34 gun positions, 50 tactical landing zones, three state-of-the-art training facilities for Military Operations in Urban Terrain and 80 live-fire ranges.

MCB Camp Lejeune provides housing, facilities, training lands and logistical support for Fleet Marine Force Units and other assigned units. The Base covers 26,000 acres of water, 29,000 acres of forested wetlands, 20,000 acres of non-forested wetlands, 72,000 acres of upland forests and 7,500 acres of urban/developed land.

MCB Camp Lejeune currently operates five drinking water systems that serve various parts of the Base. In the early 1980s, industrial chemicals, that as a group are called volatile organic compounds (VOCs), were found in drinking water systems that served the Tarawa Terrace and Hadnot Point areas at MCB Camp Lejeune. These chemicals, primarily trichloroethylene (TCE) (a commonly used metal degreasing solvent) and perchloroethylene (PCE) (a commonly used dry cleaning solvent), but also benzene (a fuel component), and other related chemicals were found to be impacting certain drinking water wells that supplied drinking water systems in these areas (no drinking water regulations applied to these chemicals at the time). Once identified, the impacted wells were promptly taken out of service. Recent studies have estimated that drinking water systems at Camp Lejeune may have been impacted from 1957, or perhaps earlier, until as late as 1987. Today, Camp Lejeune's drinking water is tested more frequently and for more chemicals than required and meets regulatory standards.



EXECUTIVE TIMELINE



1980 – 1982: Unidentified VOCs interfere with total trihalomethanes (TTHM) testing.

1984 – 1985: Ten drinking water wells identified as being impacted by VOCs were promptly removed from service. Marine Corps notifies residents through notices and articles in local papers.

1989 – 1992: Safe Drinking Water Act adds TCE, benzene, and PCE to list of regulated chemicals. Outreach that includes information about these chemicals and clean-up activities continues.

1991 – 1997: Agency for Toxic Substances and Disease Registry (ATSDR) develops Public Health Assessment (PHA) of Camp Lejeune. Marine Corps provides data and the Department of the Navy provides funding for study.

1999 – Present: ATSDR studies children born to mothers living in Base housing between 1968 and 1985. Marine Corps provides assistance to ATSDR by providing data and by locating potential study participants through outreach program. Department of the Navy provides funding for study.

2000 – Present: Significant technology advancements improve ability to share information.

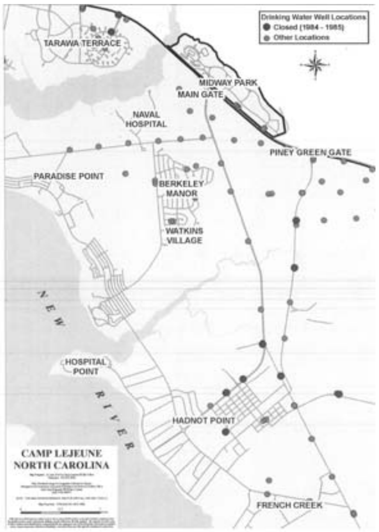
2004 (Oct): The Commandant's Fact Finding Panel reports Camp Lejeune provided drinking water consistent with general practices at the time.

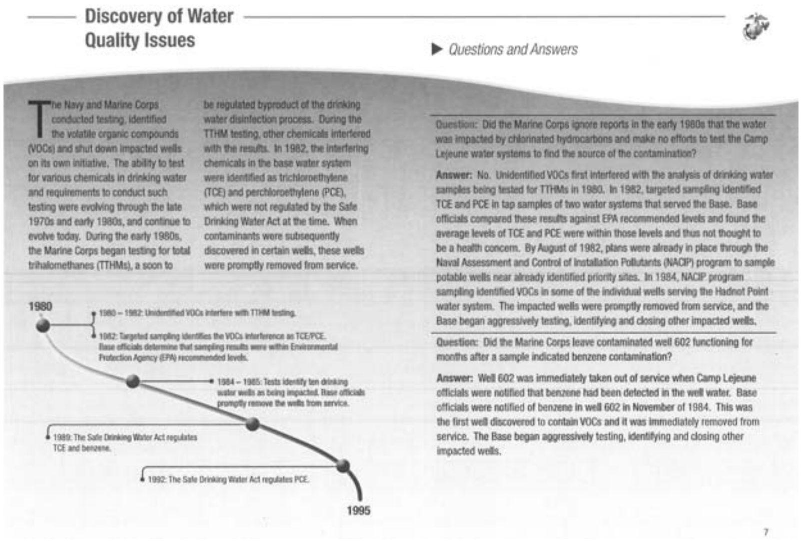
2005: The Marine Corps contracts with Booz Allen Hamilton to conduct a base-wide search for any potentially relevant information.

2007 (Jun): ATSDR publishes water model that indicates that water provided to Tarawa Terrace housing could have been impacted from as early as 1957 to as late as 1987.

2007 (Sep): The Marine Corps launches an online registry that can be accessed on the Internet to keep former Camp Lejeune residents, workers, and interested parties informed about this issue.

2009 (Jun): The National Research Council (NRC) publishes its Contaminated Water Supplies at Camp Lejeune report.





Discovery of Water Quality Issues

▶ *Questions and Answers*

The Navy and Marine Corps conducted testing, identified the volatile organic compounds (VOCs) and shut down impacted wells on its own initiative. The ability to test for various chemicals in drinking water and requirements to conduct such testing were evolving through the late 1970s and early 1980s, and continue to evolve today. During the early 1980s, the Marine Corps began testing for total trihalomethanes (TTHMs), a soon to be regulated byproduct of the drinking water disinfection process. During the TTHM testing, other chemicals interfered with the results. In 1982, the interfering chemicals in the base water system were identified as trichloroethylene (TCE) and perchloroethylene (PCE), which were not regulated by the Safe Drinking Water Act at the time. When contaminants were subsequently discovered in certain wells, these wells were promptly removed from service.

1980

1980 – 1982: Unidentified VOCs interfere with TTHM testing.

1982: Targeted sampling identifies the VOCs interference as TCE/PCE. Base officials determine that sampling results were within Environmental Protection Agency (EPA) recommended levels.

1984 – 1985: Tests identify ten drinking water wells as being impacted. Base officials promptly remove the wells from service.

1989: The Safe Drinking Water Act regulates TCE and benzene.

1992: The Safe Drinking Water Act regulates PCE.

1995

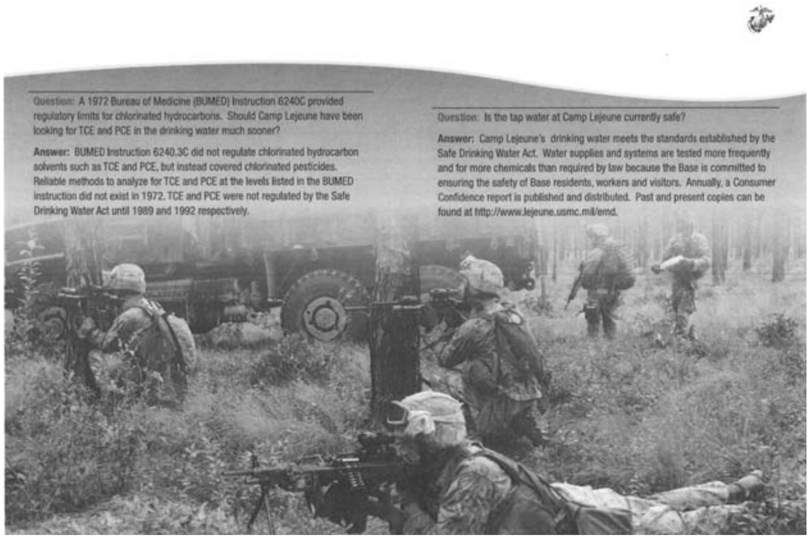
Question: Did the Marine Corps ignore reports in the early 1980s that the water was impacted by chlorinated hydrocarbons and make no efforts to test the Camp Lejeune water systems to find the source of the contamination?

Answer: No. Unidentified VOCs first interfered with the analysis of drinking water samples being tested for TTHMs in 1980. In 1982, targeted sampling identified TCE and PCE in tap samples of two water systems that served the Base. Base officials compared these results against EPA recommended levels and found the average levels of TCE and PCE were within those levels and thus not thought to be a health concern. By August of 1982, plans were already in place through the Naval Assessment and Control of Installation Pollutants (NACIP) program to sample potable wells near already identified priority sites. In 1984, NACIP program sampling identified VOCs in some of the individual wells serving the Hadnot Point water system. The impacted wells were promptly removed from service, and the Base began aggressively testing, identifying and closing other impacted wells.

Question: Did the Marine Corps leave contaminated well 602 functioning for months after a sample indicated benzene contamination?

Answer: Well 602 was immediately taken out of service when Camp Lejeune officials were notified that benzene had been detected in the well water. Base officials were notified of benzene in well 602 in November of 1984. This was the first well discovered to contain VOCs and it was immediately removed from service. The Base began aggressively testing, identifying and closing other impacted wells.

7



Question: A 1972 Bureau of Medicine (BUMED) Instruction 6240C provided regulatory limits for chlorinated hydrocarbons. Should Camp Lejeune have been looking for TCE and PCE in the drinking water much sooner?

Answer: BUMED Instruction 6240.3C did not regulate chlorinated hydrocarbon solvents such as TCE and PCE, but instead covered chlorinated pesticides. Reliable methods to analyze for TCE and PCE at the levels listed in the BUMED instruction did not exist in 1972. TCE and PCE were not regulated by the Safe Drinking Water Act until 1989 and 1992 respectively.

Question: Is the tap water at Camp Lejeune currently safe?

Answer: Camp Lejeune's drinking water meets the standards established by the Safe Drinking Water Act. Water supplies and systems are tested more frequently and for more chemicals than required by law because the Base is committed to ensuring the safety of Base residents, workers and visitors. Annually, a Consumer Confidence report is published and distributed. Past and present copies can be found at http://www.lejeune.usmc.mil/emd.

Health Initiatives and Independent Reviews

▶ *Questions and Answers*

The Marine Corps believes that the best way to assist our Marines and their families is to continue to support the independent research initiatives and independent reviews associated with this issue. Our goal is to use the best available science to get our Marines and their family members the answers they deserve.

Since 1991, several health initiatives have been conducted to identify the possible effects of exposure to contaminated water at Camp Lejeune. The studies conducted to date have not shown any causal link between exposure to contaminated water at Camp Lejeune and illnesses.

The most recent review by the National Academies' National Research Council (NRC) concluded in 2009 that adverse effects were unlikely, but could not be ruled out completely. The NRC also determined that additional health studies are unlikely to provide more definitive results.

Additionally, three independent reviews have been conducted on the issue. These reviews covered the actions of Marine officials in the 1980s, the state of drinking water management across the country at the same time, and allegations of negligence and a conspiracy to hide the truth. The reviews found that no laws were broken and rejected charges that the Marine Corps concealed evidence.

Question: Has science linked exposure to contaminated water at Camp Lejeune to illnesses in former residents?

Answer: At this time, scientific studies have not linked exposure to the impacted drinking water at Camp Lejeune to any illnesses. The Marine Corps is providing data, access, and logistical assistance to ATSDR to project when the drinking water was first impacted, who may have consumed that water, and whether there is any link between exposure to the contaminated water and certain illnesses. The 2009 NRC report concluded that adverse effects were unlikely, but could not be ruled out completely, and additional health studies are unlikely to provide more definitive results.

Question: Does the Marine Corps want to delay ATSDR's studies because it knows it will find a connection between exposure and illnesses?

Answer: No. The people who were exposed are our family members and fellow Marines. We, as much as anyone, want to be able to give them accurate answers as quickly as scientifically feasible. The Marine Corps does not have anything to gain from delaying ATSDR's studies, nor a vested interest in the specific outcome of research initiatives. Marine Corps leadership has been in contact with ATSDR over the years to see what, if anything, could be done to speed the completion of ATSDR studies. We are committed to providing ATSDR full and timely access to all pertinent information we possess on this subject so that the best science can be achieved.

Question: Were those who lived and worked at Camp Lejeune exposed to extremely high levels of chemicals through the water?

Answer: The exposures experienced at Camp Lejeune through the drinking water are generally considered lower level environmental type exposures relative to higher level occupational type exposures. The 2009 NRC Report in reference to TCE and PCE stated, "A central issue in toxicology (at Camp Lejeune) is whether doses were sufficient to produce specific adverse effects. The lowest doses at which adverse health effects have been seen in animal or clinical studies are many times higher than the worse-case (highest) assumed exposures at Camp Lejeune. However, that does not rule out the possibility that other, more subtle health effects that have not been well studied could occur, although it somewhat diminishes their likelihood."

Question: Did the Marine Corps influence the NRC to get "favorable" answers to its June 2009 study?

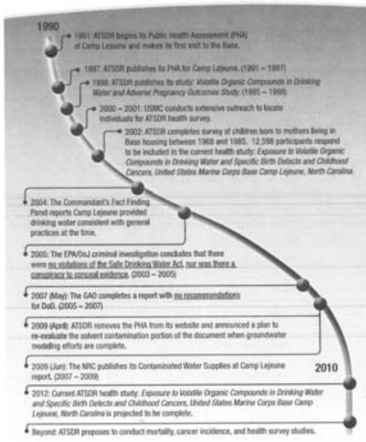
Answer: The Marine Corps has never made any effort to influence the outcome of any scientific studies — including the NRC report. The Marine Corps funded the NRC's work, at the direction of Congress, because it is a preeminent scientific body with a mission that includes advising the government in matters involving science, engineering, technology and health. The Marine Corps has nothing to gain from a particular outcome. Our goal has never been to reach a pre-determined answer — rather we are searching for the answers that are supported by sound science.

Question: Did the Marine Corps have to answer for the contamination at Camp Lejeune?

Answer: There have been three independent reviews of the Marine Corps' actions in the early 1980s. In 2004, the Marine Corps chartered an independent review of the issue; between 2005 and 2007, the Government Accountability Office (GAO) looked into the matter; and between 2003 and 2005, the EPA's Criminal Investigation Division (CID) and Department of Justice (DoJ) investigated both actions in the 1980s and allegations of attempts to cover up wrongdoing.

The Commandant's Fact-Finding Panel (2004) found that Camp Lejeune drinking water was consistent with industry standards that existed at the time, and found no evidence of an attempt to conceal information. The GAO study had no recommendations for the Department of Defense (DoD). The EPA/DoJ Criminal Investigation (2005) found no violations of the Safe Drinking Water Act and no conspiracy to conceal evidence.

HEALTH INITIATIVES AND INDEPENDENT REVIEWS TIMELINE



1991: ATSDR begins its Public Health Assessment (PHA) of Camp Lejeune and makes its first visit to the Base.

1997: ATSDR publishes its PHA for Camp Lejeune. (1991 – 1997)

1998: ATSDR publishes its study: *Volatile Organic Compounds in Drinking Water and Adverse Pregnancy Outcomes Study.* (1995 – 1998)

2000 – 2001: USMC conducts extensive outreach to locate individuals for ATSDR health survey.

2002: ATSDR completes survey of children born to mothers living in Base housing between 1968 and 1985. 12,598 participants respond to be included in the current health study: *Exposure to Volatile Organic Compounds in Drinking Water and Specific Birth Defects and Childhood Cancers, United States Marine Corps Base Camp Lejeune, North Carolina.*

2004: The Commandant's Fact Finding Panel reports Camp Lejeune provided drinking water consistent with general practices at the time.

2005: The EPA/DoJ criminal investigation concludes that there were no violations of the Safe Drinking Water Act, nor was there a conspiracy to conceal evidence. (2003 – 2005)

2007 (May): The GAO completes a report with no recommendations for DoD. (2005 – 2007)

2009 (April): ATSDR removes the PHA from its website and announced a plan to re-evaluate the solvent contamination portion of the document when groundwater modeling efforts are complete.

2009 (Jun): The NRC publishes its Contaminated Water Supplies at Camp Lejeune report. (2007 – 2009)

2012: Current ATSDR health study: *Exposure to Volatile Organic Compounds in Drinking Water and Specific Birth Defects and Childhood Cancers, United States Marine Corps Base Camp Lejeune, North Carolina* is projected to be complete.

Beyond: ATSDR proposes to conduct mortality, cancer incidence, and health survey studies.

Information Sharing

The Marine Corps has spent thousands of hours and more than $2 million collecting information for past and ongoing health and research initiatives. This information collection and sharing initiative is unique in its breadth and scope.

Over the years, advances in technology improved our ability to identify, catalogue, assess and share the information in our possession with public health agencies studying the issue and with the general public. The Internet, e-mail and other information technology systems increased the rate at which we provide assistance to scientific organizations researching the issue and make information more readily available across the globe. Advances in technology improved our ability to maintain, process and transfer information, and also added to our understanding of the chemicals that were present in Camp Lejeune's water in the early and mid-1980s.

INFORMATION SHARING HIGHLIGHTS:

- Cooperation and information sharing with ATSDR for its Camp Lejeune Public Health Assessment began in 1991. This included numerous ATSDR visits, interviews, meetings and document requests. Since 1991, the Marine Corps has provided volumes of data, and ATSDR has had full access to information the Marine Corps controls.
- The Comprehensive Environmental Response, Compensation, and Liability Act Administrative Record which currently contains approximately 5,000 documents related to the cleanup program has been publicly available in Onslow County Library since 1992 and online since 1999.
- The Marine Corps has been proactively collecting and consolidating information thought to be pertinent since the early 1990s. We have provided this data not only to ATSDR, but to other interested parties as well.
- In 2005, the Marine Corps hired a contractor to conduct an additional search of Camp Lejeune for potentially relevant documents. 718 buildings, totaling about 198,000 linear feet of file space, were searched and 6,295 documents were collected and placed in a central location. ATSDR has had ready access to these documents since the search effort began.

▶ *Questions and Answers*

Question: Has the Marine Corps cooperated with ATSDR on their health initiatives at Camp Lejeune?

Answer: The Marine Corps has assisted ATSDR since the very beginning of their work at Camp Lejeune — providing tens of thousands of documents, spending millions of dollars and countless man-hours. From the beginning, our actions have been guided by the belief that getting answers supported by the best possible science is the most important thing the Marine Corps can do for the former residents and workers of Camp Lejeune.

Question: Has the Marine Corps intentionally withheld information from ATSDR in order to delay their studies?

Answer: No. The Marine Corps has made extraordinary efforts to provide ATSDR access to any potentially relevant information we control. We recognize that this issue deals with complex science, and we have been working with ATSDR to get our former residents the answers they deserve in a timely manner.

As the Marine Corps has reviewed thousands of documents, representing decades of information, our understanding of the issue has grown. With greater understanding, and in close cooperation with the scientific experts at ATSDR, we have been better able to identify and provide pertinent information. We remain committed to those efforts today. Throughout the years, we have invited ATSDR to come to Camp Lejeune and look through all of our documents themselves. It is important to note that the information is mostly documents and scanned files — not computer discs — consistent with how information was collected at the time.

The Marine Corps does not benefit in any way from delays to ATSDR's work. The people who were exposed are our family members and fellow Marines. We, as much as anyone, want to be able to give them accurate answers in a timely manner.

Question: Did ATSDR only learn about fuel/benzene contamination at the Hadnot Point Fuel Farm in 2009?

Answer: No. Information related to fuel contamination, including benzene, at Camp Lejeune has been documented and reported on since the early 1980s and is cited in numerous documents in the publicly accessible Administrative Record. ATSDR's draft and 1997 final Public Health Assessment (PHA) included references to benzene, as did ATSDR's 1998 Adverse Pregnancy Outcomes study.

Outreach

▶ *Questions and Answers*

The Marine Corps has conducted notification and outreach on this important issue since the impacted wells were discovered in 1984 – 1985. This effort began with a press conference in December of 1984, and spans our outreach campaign in 2000 – 2001 to solicit participants for ATSDR's current study, to our recent robust advertising efforts and drinking water notification registry that now includes over 160,000 individuals. Our outreach efforts have also evolved over time as more information became available and as technological advances further enabled our ability to conduct notification. The creation of the Internet, e-mail and the growth of cable news channels exponentially increased the speed and ease with which we can reach former residents. The Marine Corps is committed to using all available methods to notify as many former residents and workers as possible.

Currently, the Marine Corps uses various electronic and print media to reach our former Base residents and workers. Overall, the Marine Corps has invested more than $3 million in a coordinated media outreach campaign. Some of our outreach venues include:

- *Military Community* — 19 outlets, including Veterans Affairs agencies, Military magazines, websites, Base newspapers and retirement organizations.
- *General Print Media* — advertisements in 11 magazines, such as Time, Newsweek, Good Housekeeping and Sports Illustrated.
- *Online Media* — advertisements with more than ten popular websites, such as Yahoo, Google, NFL.com, WebMD.com and Weather.com.
- *Social Media* — Facebook page and registration website.

Question: Has the Marine Corps attempted to notify all former Camp Lejeune residents and workers?

Answer: The Marine Corps is actively reaching out to former Camp Lejeune residents and workers who are now located around the world. The Marine Corps has used records from the Defense Manpower Data Center, the IRS Computerized Letter Forwarding Program, and various electronic and print media communication venues, such as newspapers and magazines, radio spots, posters and websites to locate former residents and provide information.

Question: Are Camp Lejeune families only finding out about the water contamination because the Congress and the media are involved?

Answer: No. The Marine Corps has been working to "get the word out" about the issue since it was first discovered because it is the right thing to do for our former residents and workers. Since former Camp Lejeune residents are now spread across the world, working with the media on stories about the contamination is one of the most effective ways of informing them and encouraging them to sign up with the Camp Lejeune Water registry. As part of our continued effort to provide information, we have a website that has a wealth of information to help people learn about this issue and recently established a Facebook page.

Question: Has the Marine Corps been trying to cover up the water contamination for decades?

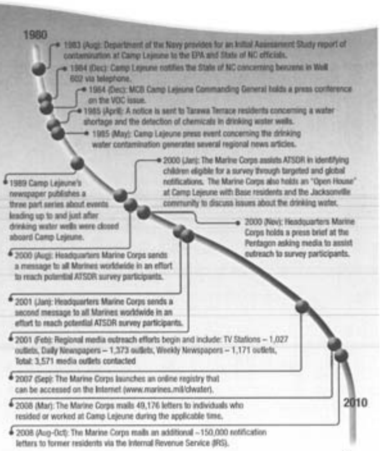
Answer: No. The Marine Corps began informing Camp Lejeune residents about the contamination beginning in 1984. Camp Lejeune issued a press release, ran a story in the Base newspaper, and did interviews with local and regional media in 1984 and 1985. Although this type of notification is now a requirement under

NOTIFICATION AND OUTREACH TIMELINE

the Safe Drinking Water Act, it was not required at the time. In the late 1990s, the Marine Corps began using the media to reach out to former residents and inform them of the ATSDR studies – and we continue that outreach today using advances in technology like the Internet and social networking. The EPA Criminal Investigation Division (CID) found no violations of enforceable regulations had occurred and that there was no evidence of conspiracy.

Question: Are claims being denied because the Marine Corps is not telling the Veterans Administration (VA) about the contamination?

Answer: The Marine Corps does not control, nor is it involved with, the Veterans Administration claims process. However, we have been regularly communicating with the Veterans Administration about Camp Lejeune water contamination since 2007 to provide them with information and to use their assistance to encourage former residents to register for updates on future studies.



1983 (Aug): Department of the Navy provides for an Initial Assessment Study report of contamination at Camp Lejeune to the EPA and State of NC officials.

1984 (Dec): Camp Lejeune notifies the State of NC concerning benzene in Well 602 via telephone.

1984 (Dec): MCB Camp Lejeune Commanding General holds a press conference on the VOC issue.

1985 (April): A notice is sent to Tarawa Terrace residents concerning a water shortage and the detection of chemicals in drinking water wells.

1985 (May): Camp Lejeune press event concerning the drinking water contamination generates several regional news articles.

1989 Camp Lejeune's newspaper publishes a three part series about events leading up to and just after drinking water wells were closed aboard Camp Lejeune.

2000 (Jan): The Marine Corps assists ATSDR in identifying children eligible for a survey through targeted and global notifications. The Marine Corps also holds an "Open House" at Camp Lejeune with Base residents and the Jacksonville community to discuss issues about the drinking water.

2000 (Aug): Headquarters Marine Corps sends a message to all Marines worldwide in an effort to reach potential ATSDR survey participants.

2000 (Nov): Headquarters Marine Corps holds a press brief at the Pentagon asking media to assist outreach to survey participants.

2001 (Jan): Headquarters Marine Corps sends a second message to all Marines worldwide in an effort to reach potential ATSDR survey participants.

2001 (Feb): Regional media outreach efforts begin and include: TV Stations – 1,027 outlets, Daily Newspapers – 1,373 outlets, Weekly Newspapers – 1,171 outlets, Total: 3,571 media outlets contacted

2007 (Sep): The Marine Corps launches an online registry that can be accessed on the Internet (www.marines.mil/clwater).

2008 (Mar): The Marine Corps mails 49,176 letters to individuals who resided or worked at Camp Lejeune during the applicable time.

2008 (Aug-Oct): The Marine Corps mails an additional ~150,000 notification letters to former residents via the Internal Revenue Service (IRS).

Environmental Programs and Cleanup

Safe Drinking Water

The Marine Corps is committed to protecting the health of our Marines and their families and the environment. We have invested millions of dollars across the Marine Corps to ensure our environmental management programs are sound, and we continually look for ways to innovate and improve.

Providing safe and reliable water to our troops and residents is vital to our mission readiness. Camp Lejeune's Environmental Management Division takes great pride in preserving and protecting water resources and ensuring that the water provided to the Base population continues to meet the requirements of the Safe Drinking Water Act (SDWA). Technological and scientific advances have dramatically improved the ability of Camp Lejeune to monitor, test, evaluate, and treat the Base's water supplies over the last 30 years.

Camp Lejeune currently operates five drinking water plants that provide safe drinking water to more than 60,000 people on-base. Our clean water program enlists proactive control measures through monitoring, long-range studies, conservation and a proactive Environmental Restoration program, as well as many other water quality programs. Camp Lejeune works very closely with federal and state regulators to ensure our drinking water meets their rigorous standards. The Base routinely monitors for more than 150 chemicals, to include additional sampling not required by the EPA or North Carolina. This additional sampling includes monthly drinking water system sampling for VOCs and other organic compounds, such as pesticides, herbicides, as well as regular sampling for other unregulated chemicals. Camp Lejeune does this as part of a commitment to providing the safest, most reliable drinking water possible to the Base population.

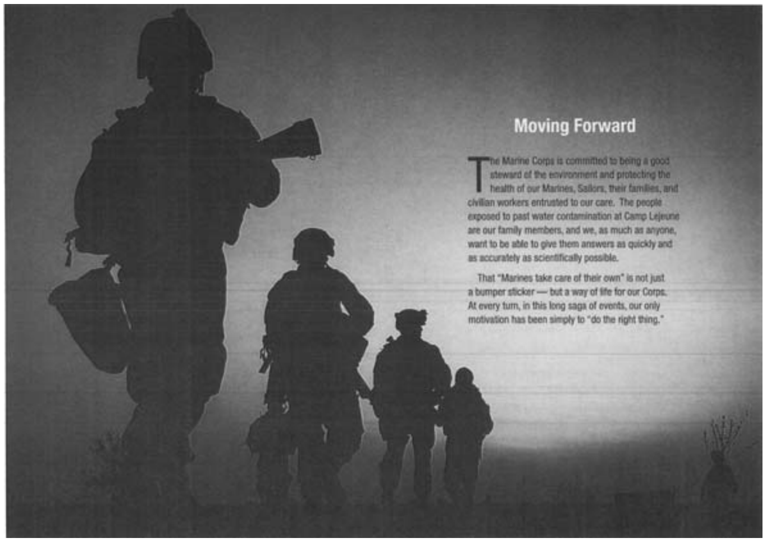
Environmental Restoration Program

Camp Lejeune is a multiple-time recipient of the Secretary of the Navy and Secretary of the Defense Awards for Environmental Restoration. The Base continues to be a leading DoD facility, operating at the forefront of environmental restoration programs and maintaining outstanding relationships with regulatory agencies and the local community.

Much of the Environmental Restoration program's success is attributable to the Camp Lejeune Environmental Restoration Partnering Team. The Partnering Team was formed in the early 1990s following the Base's listing on the EPA's National Priorities List and consists of representatives from the Base, U.S. Navy, EPA, North Carolina Department of Environment and Natural Resources, and environmental consulting firms.

Camp Lejeune also maintains a very active Restoration Advisory Board (RAB). The RAB was created in 1995 and is made up of members of the community, civic and business organizations, and civilian employees. The RAB meets quarterly and provides tours, on-site demonstrations of new technologies and informative presentations.

The Base, together with the partnering team and RAB, successfully manages over 90 active sites encompassing almost 5,000 acres under four different environmental programs including: the Installation Restoration (IR) Program, Military Munitions Response (MMR) Program, Solid Waste Management Unit (SWMU) Program and the Underground Storage Tank (UST) Program. The IR Program hosts a public website where information is posted for the public.



Moving Forward

The Marine Corps is committed to being a good steward of the environment and protecting the health of our Marines, Sailors, their families, and civilian workers entrusted to our care. The people exposed to past water contamination at Camp Lejeune are our family members, and we, as much as anyone, want to be able to give them answers as quickly and as accurately as scientifically possible.

That "Marines take care of their own" is not just a bumper sticker — but a way of life for our Corps. At every turn, in this long saga of events, our only motivation has been simply to "do the right thing."

Frequently Requested Information

Camp Lejeune Historic Drinking Water Registry

Anyone who lived or worked on board Camp Lejeune through 1987 should sign up with the Camp Lejeune Historic Drinking Water Registry. We are committed to building a registry of former Marines, residents, and civilian workers so that we can conduct direct notification upon the completion of the health studies.

Medical Conditions

The Marine Corps cares about the health and welfare of our Marine families. Although scientific studies conducted to date have not demonstrated a causal link between exposure to past Camp Lejeune water and adverse health conditions, the NRC found that it cannot be determined reliably whether or not diseases and disorders experienced by former residents and workers at Camp Lejeune are associated with exposure to contaminants in the water supply. We encourage you to contact your local or family physician regarding any questions about your health. You may also contact ATSDR's toll free line at (888) 422-8737 for further information.

Notification of ATSDR's Study Results

Upon conclusion of ATSDR's studies, the Marine Corps will notify the public of their completion. We will do this through direct notification to those on the Marine Corps notification registry and general notification via media outlets and announcements on the Marine Corps website.

Camp Lejeune Drinking Water Testing

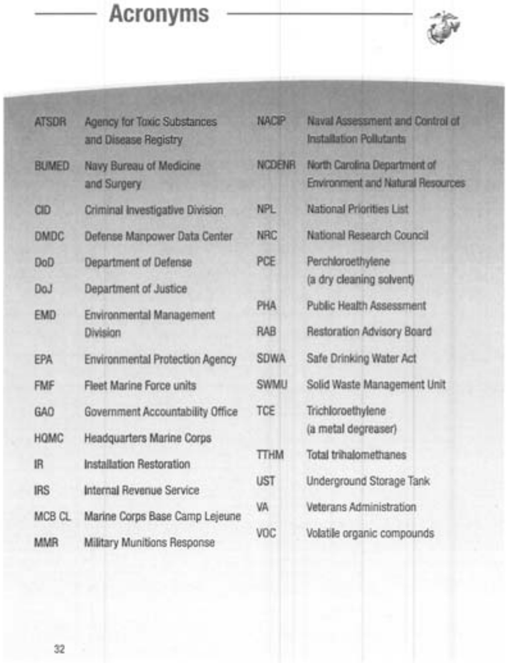
Camp Lejeune's drinking water systems are tested monthly for VOCs and drinking water wells are tested annually. The Base is in compliance with all federal and state laws and regulations to ensure safe drinking water. Camp Lejeune has a very strong and proactive environmental program.

Scope of the NRC Review

A committee of the NRC reviewed the scientific evidence on associations between adverse health effects and historical data on prenatal, childhood and adult exposures to contaminated drinking water at Camp Lejeune. The committee assessed the strength of evidence in establishing a link or association between exposure to trichloroethylene, perchloroethylene, and solvent mixtures. In addition, the NRC evaluated benzene and other VOCs as part of their review.

Scope of the GAO Review

The National Defense Authorization Act of Fiscal Year 2005 required GAO to report on past drinking water contamination and related health effects at Camp Lejeune. In its report, GAO describes (1) efforts to identify and address the past contamination, (2) activities resulting from concerns about possible adverse health effects and government actions related to the past contamination, and (3) the design of the current ATSDR study, including the study's population, time frame, selected health effects and the reasonableness of the projected completion date.



Acronyms

ATSDR	Agency for Toxic Substances and Disease Registry
BUMED	Navy Bureau of Medicine and Surgery
CID	Criminal Investigative Division
DMDC	Defense Manpower Data Center
DoD	Department of Defense
DoJ	Department of Justice
EMD	Environmental Management Division
EPA	Environmental Protection Agency
FMF	Fleet Marine Force units
GAO	Government Accountability Office
HQMC	Headquarters Marine Corps
IR	Installation Restoration
IRS	Internal Revenue Service
MCB CL	Marine Corps Base Camp Lejeune
MMR	Military Munitions Response
NACIP	Naval Assessment and Control of Installation Pollutants
NCDENR	North Carolina Department of Environment and Natural Resources
NPL	National Priorities List
NRC	National Research Council
PCE	Perchloroethylene (a dry cleaning solvent)
PHA	Public Health Assessment
RAB	Restoration Advisory Board
SDWA	Safe Drinking Water Act
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene (a metal degreaser)
TTHM	Total trihalomethanes
UST	Underground Storage Tank
VA	Veterans Administration
VOC	Volatile organic compounds

Links

USMC Camp Lejeune Historic Drinking Water website
www.marines.mil/clwater

Agency for Toxic Substances and Disease Registry (ATSDR)
www.atsdr.cdc.gov/sites/lejeune

Camp Lejeune Environmental Management Division
www.lejeune.usmc.mil/emd

National Academies' National Research Council report on Camp Lejeune
http://www.nationalacademies.org/morenews/20090613.html

GAO Report on Camp Lejeune
http://www.gao.gov/new.items/d07276.pdf

For complete details and more frequently asked questions regarding the Camp Lejeune Historic Drinking Water Registry, on-going studies, and other information, please visit our website at www.marines.mil/clwater. You can also call our toll-free information line at (877) 261-9782 to speak to a representative who can assist you with questions and concerns.

CAMP LEJEUNE
HISTORIC
DRINKING
WATER

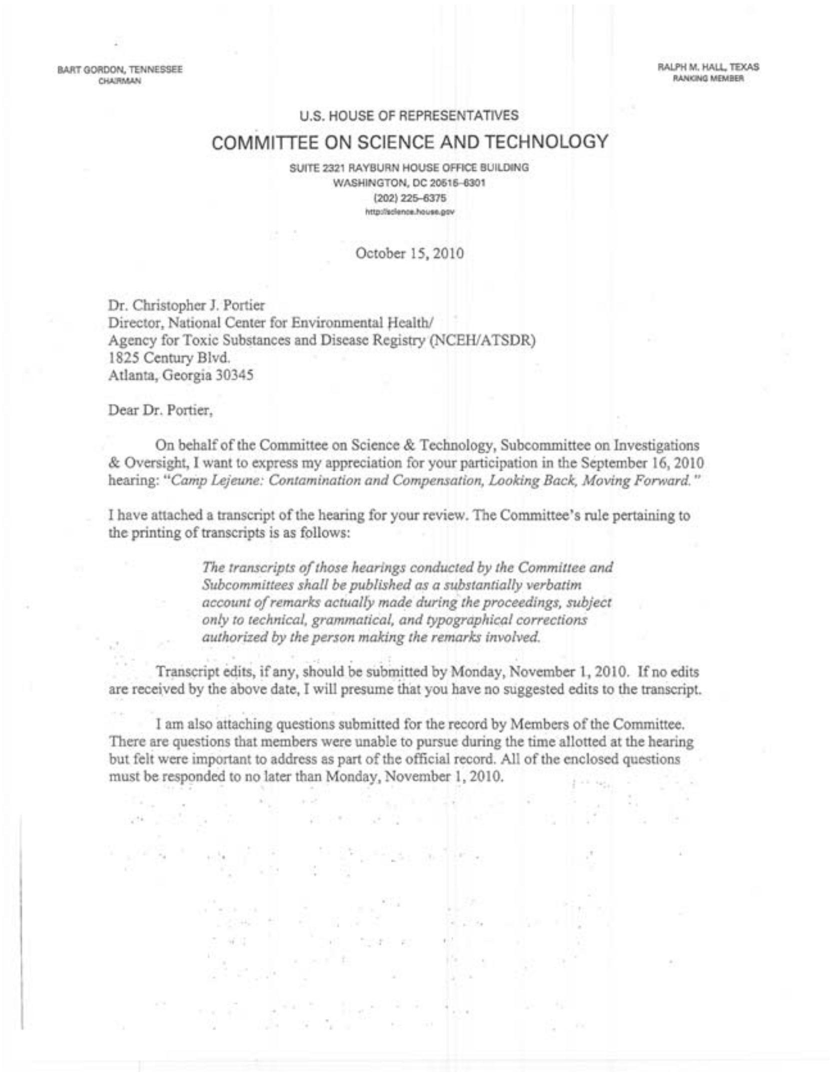
Questions submitted by Representative Paul C. Broun

The question below was originally submitted by Ranking Member Broun to Mr. Thomas J. Pamperin, Associate Deputy Under Secretary for Policy and Program Management, Veterans Benefit Administration, U.S. Department of Veterans Affairs. The VA and Mr. Pamperin deferred the question to the Department of Defense with the concurrence of Dr. Broun's staff. The response to that question from Major General Payne is listed below.

Q1. During the time that the water at Camp Lejeune was contaminated, it was not only military personnel who were exposed, but civil servants and dependents were also potentially exposed.

c. In the past 50 years, have there been similar situations in which dependents and civil servants were exposed to the same contamination as military personnel?

A1. The Marine Corps is not aware of similar situations at other installations in which Marine Corps dependents, dependents of personnel from other services living aboard Marine Corps installations, or civilian employees were exposed to environmental contamination at levels of potential concern. Under the Comprehensive Environmental Response, Compensation, and Liability Act, the Agency for Toxic Substances and Disease Registry (ATSDR) conducts public health assessments (PHAs) for all sites on the National Priorities List. A review of PHAs for Marine Corps installations indicates that ATSDR only identified potential public health hazards from environmental contaminants at Marine Corps Base (MCB) Camp Lejeune and the former Marine Corps Air Station (MCAS) El Toro. The PHA for MCB Camp Lejeune, which was removed from ATSDR's website in April 2009 for re-evaluation, indicated a past public health hazard related to environmental contamination. While the PHA for MCAS El Toro indicated an "indeterminate public health hazard" related to environmental contamination due to a lack of data, ATSDR found that identified exposures (carbon tetrachloride, chloroform, trichloroethylene, perchloroethylene, and nitrates-N) detected in regional groundwater at the levels detected "does not represent a public health hazard" at this time.



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October 15, 2010

Dr. Christopher J. Portier
Director, National Center for Environmental Health/
Agency for Toxic Substances and Disease Registry (NCEH/ATSDR)
1825 Century Blvd.
Atlanta, Georgia 30345

Dear Dr. Portier,

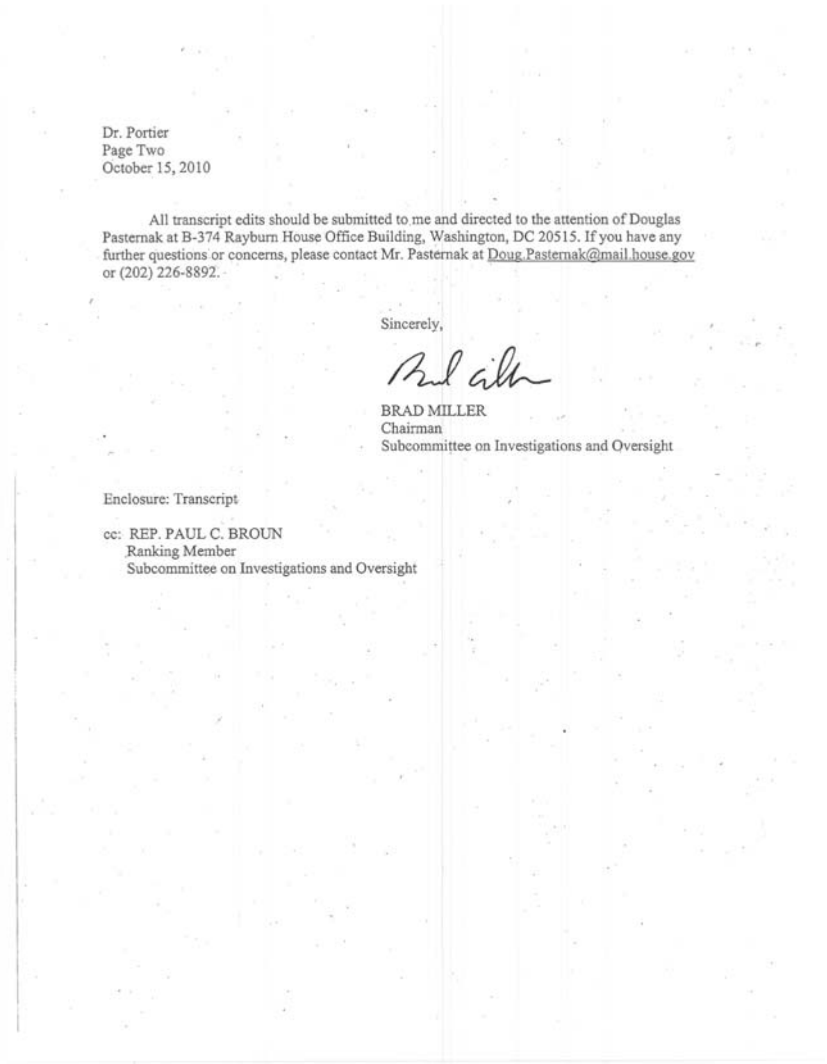
On behalf of the Committee on Science & Technology, Subcommittee on Investigations & Oversight, I want to express my appreciation for your participation in the September 16, 2010 hearing: *"Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward."*

I have attached a transcript of the hearing for your review. The Committee's rule pertaining to the printing of transcripts is as follows:

> *The transcripts of those hearings conducted by the Committee and Subcommittees shall be published as a substantially verbatim account of remarks actually made during the proceedings, subject only to technical, grammatical, and typographical corrections authorized by the person making the remarks involved.*

Transcript edits, if any, should be submitted by Monday, November 1, 2010. If no edits are received by the above date, I will presume that you have no suggested edits to the transcript.

I am also attaching questions submitted for the record by Members of the Committee. There are questions that members were unable to pursue during the time allotted at the hearing but felt were important to address as part of the official record. All of the enclosed questions must be responded to no later than Monday, November 1, 2010.



Dr. Portier
Page Two
October 15, 2010

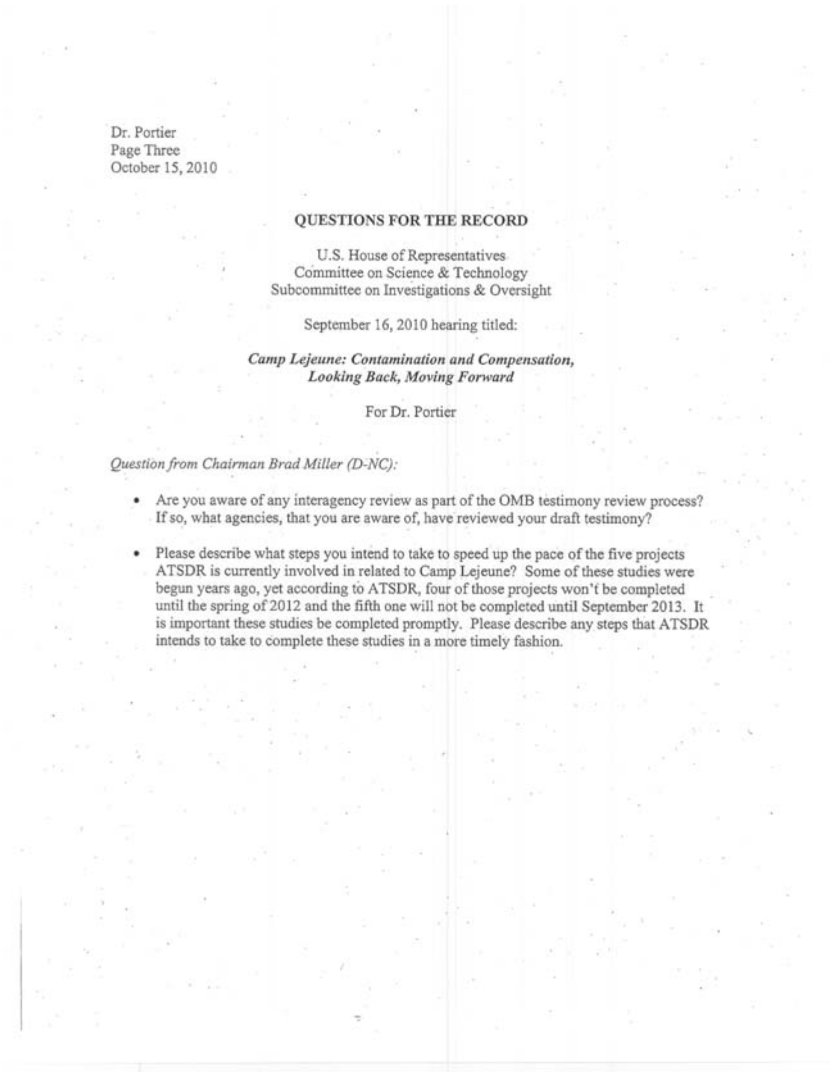
All transcript edits should be submitted to me and directed to the attention of Douglas Pasternak at B-374 Rayburn House Office Building, Washington, DC 20515. If you have any further questions or concerns, please contact Mr. Pasternak at Doug.Pasternak@mail.house.gov or (202) 226-8892.

Sincerely,

BRAD MILLER
Chairman
Subcommittee on Investigations and Oversight

Enclosure: Transcript

cc: REP. PAUL C. BROUN
Ranking Member
Subcommittee on Investigations and Oversight



Dr. Portier
Page Three
October 15, 2010

QUESTIONS FOR THE RECORD

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

September 16, 2010 hearing titled:

Camp Lejeune: Contamination and Compensation,
Looking Back, Moving Forward

For Dr. Portier

Question from Chairman Brad Miller (D-NC):

- Are you aware of any interagency review as part of the OMB testimony review process? If so, what agencies, that you are aware of, have reviewed your draft testimony?
- Please describe what steps you intend to take to speed up the pace of the five projects ATSDR is currently involved in related to Camp Lejeune? Some of these studies were begun years ago, yet according to ATSDR, four of those projects won't be completed until the spring of 2012 and the fifth one will not be completed until September 2013. It is important these studies be completed promptly. Please describe any steps that ATSDR intends to take to complete these studies in a more timely fashion.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Dr. Chris Portier, Director, Agency for Toxic Substances and Disease Registry (ATSDR)

Questions submitted by Chairman Brad Miller

Q1. Are you aware of any interagency review as part of the OMB testimony review process? If so, what agencies, that you are aware of, have reviewed your draft testimony?

A1. Interagency review is part of the standard procedures for clearance of testimony of federal agency witnesses, since such witnesses are Administration witnesses. Pursuant to long-standing OMB protocols, federal agencies are required to submit draft Congressional testimony to OMB. OMB coordinates clearance of the testimony so as to assure appropriate consideration of the views of all affected agencies. ATSDR's testimony for the Camp Lejeune hearing went through interagency clearance, and ATSDR addressed comments received from other agencies. Where ATSDR made changes to the testimony after consideration of other agencies' comments, the changes were approved by me, as was the final testimony.

Q2. Please describe what steps you intend to take to speed up the pace of the five projects ATSDR is currently involved in related to Camp Lejeune? Some of these studies were begun years ago, yet according to ATSDR, four of those projects won't be completed until the spring of 2012 and the fifth one will not be completed until September 2013. It is important these studies be completed promptly. Please describe any steps that ATSDR intends to take to complete these studies in a more timely fashion.

Water modeling is a key component of ATSDR's ongoing studies at Camp Lejeune. Because only limited measurements of contaminant concentrations are available, ATSDR is using complex modeling techniques to reconstruct historical conditions of groundwater flow, contaminant fate and transport, and the distribution of contaminated drinking water delivered to family housing areas. The modeling requires identification, review and organization of vast amounts of historical data and other information. Delays in obtaining from DOD data for water modeling have delayed completion of the studies that rely on the modeling.

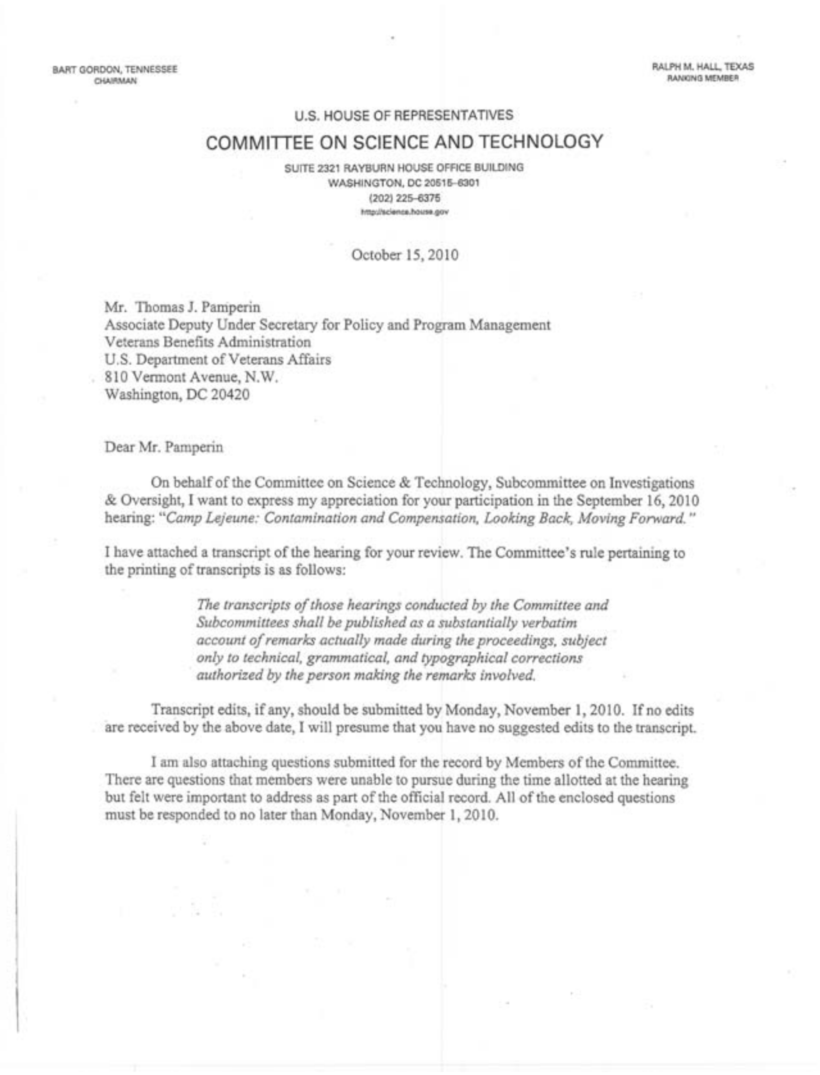
ATSDR has taken several steps, which the Agency intends to maintain, in an effort to complete all water-modeling activities more rapidly, without compromising accuracy or thoroughness. For example:

- ATSDR has added technical and administrative staff to the water-modeling team:
  - ○ A senior-level hydrogeologist has been brought on board full time, through an interagency agreement with the US Geological Survey; this team member, who resides at ATSDR, conducts data and water-modeling analyses.
  - ○ An ATSDR environmental health scientist with petroleum engineering academic and professional experience has been assigned to the water-modeling effort 60 percent of the time to assist with geohydrologic analyses and characterizations.
  - ○ A fulltime employee has been brought on board through the Senior Environmental Employment Program to further assist with data and information analyses.
  - ○ An administrative assistant has been assigned for water-modeling project use, 50 percent time, to assist with administrative tasks such as Quality Assessment/Quality Control review of reports and data, and other project administrative tasks.
- To promptly complete all data discovery activities:
  - ○ ATSDR assigned additional staff to represent ATSDR on the ATSDR/DON/USMC data mining and discovery technical work group.
  - ○ An ATSDR staff was assigned as a liaison to Camp Lejeune for this activity.
- Computational capacity continues to be enhanced through the purchase during FY 2010 of ten 64-bit, high-end scientific workstations, to enable simultaneous simulation runs of groundwater flow, fate, and transport.

The above measures are increasing the pace of water modeling of Hadnot Point and Holcomb Boulevard, and in turn will expedite completion of (1) the re-analysis of the pregnancy outcome study (also known as the small for gestational age, or SGA, study), (2) the case-control study of neural tube defects, oral clefts, and childhood hematopoietic cancers, and (3) the mortality study. ATSDR will use the results from this modeling to conduct the analyses for these studies.

Also to complete these studies as quickly as possible, ATSDR plans to do virtually all of the analyses with the preliminary results from the water modeling, plugging in the final results of the water modeling when they become available.

As for the health survey, the contract was awarded in September, 2010, and work began in October, 2010. The first wave of health surveys will be sent out in the late winter and early spring of next year. The additional mailings to encourage participation will take approximately 6 months, i.e., until near the end of the summer. Analyzing the surveys and determining whether to go forward with the morbidity study (i.e., confirmation of participant-reported cancers and other diseases of interest) will take approximately an additional 2 to 3 months. The health survey part of the project is expected to be completed by the end of November 2011. An expert panel will be convened to review the results from the initial phase and to make recommendations as to whether to go forward. If ATSDR does go forward, then confirmation of reported diseases, data analyses and report writing will take at least another 18 months. We anticipate that the currently planned projects associated with Camp Lejeune will be completed by summer of 2013.



BART GORDON, TENNESSEE
CHAIRMAN

RALPH M. HALL, TEXAS
RANKING MEMBER

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-6301
(202) 225-6375
http://science.house.gov

October 15, 2010

Mr. Thomas J. Pamperin
Associate Deputy Under Secretary for Policy and Program Management
Veterans Benefits Administration
U.S. Department of Veterans Affairs
810 Vermont Avenue, N.W.
Washington, DC 20420

Dear Mr. Pamperin

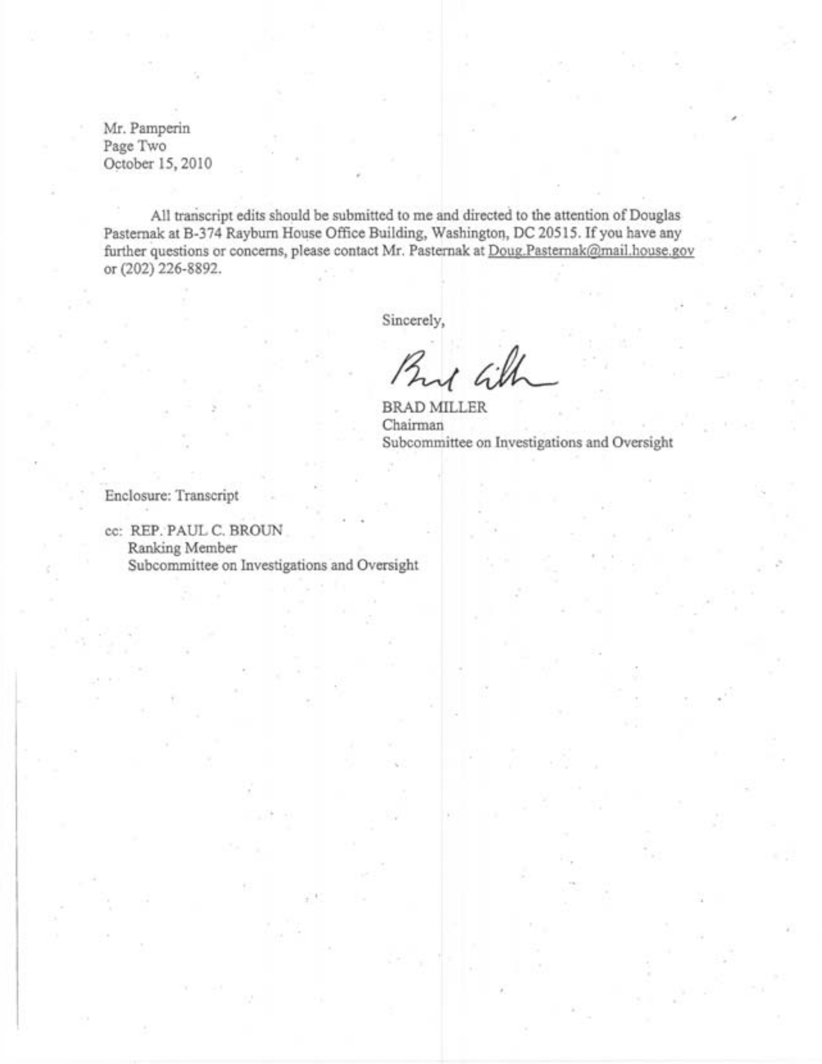
On behalf of the Committee on Science & Technology, Subcommittee on Investigations & Oversight, I want to express my appreciation for your participation in the September 16, 2010 hearing: "*Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward.*"

I have attached a transcript of the hearing for your review. The Committee's rule pertaining to the printing of transcripts is as follows:

> *The transcripts of those hearings conducted by the Committee and Subcommittees shall be published as a substantially verbatim account of remarks actually made during the proceedings, subject only to technical, grammatical, and typographical corrections authorized by the person making the remarks involved.*

Transcript edits, if any, should be submitted by Monday, November 1, 2010. If no edits are received by the above date, I will presume that you have no suggested edits to the transcript.

I am also attaching questions submitted for the record by Members of the Committee. There are questions that members were unable to pursue during the time allotted at the hearing but felt were important to address as part of the official record. All of the enclosed questions must be responded to no later than Monday, November 1, 2010.



Mr. Pamperin
Page Two
October 15, 2010

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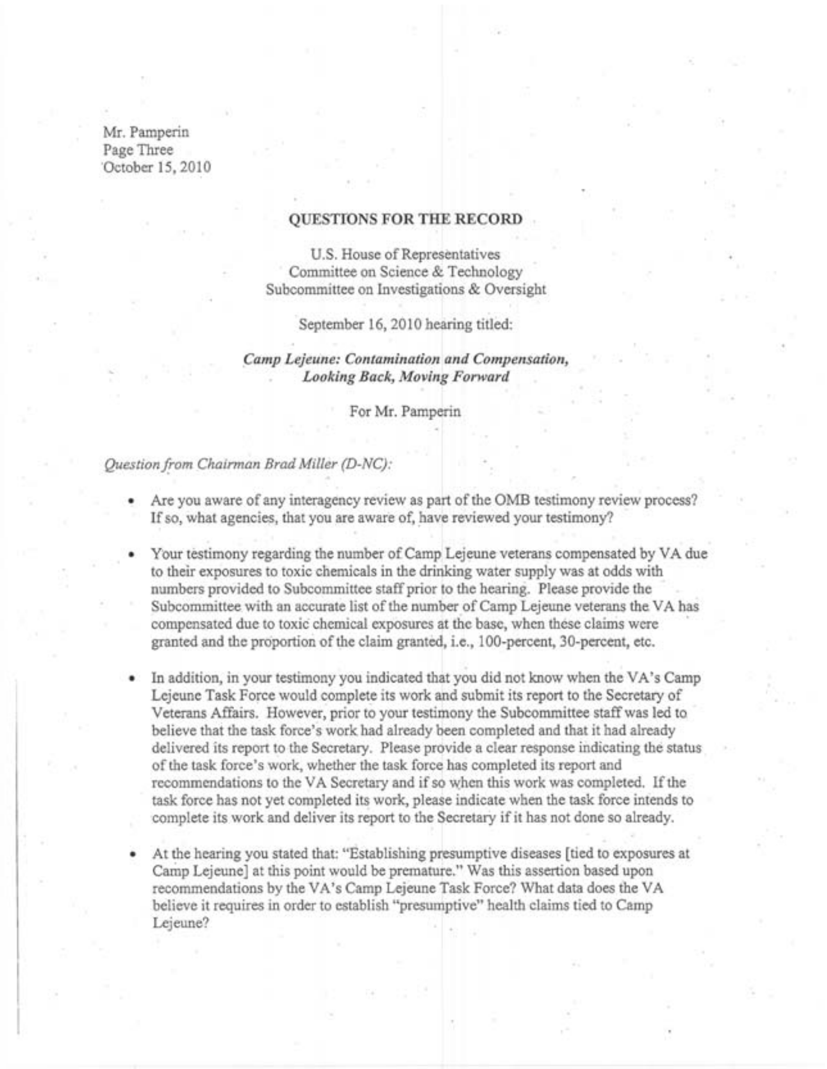
Sincerely,

BRAD MILLER
Chairman
Subcommittee on Investigations and Oversight

Enclosure: Transcript

cc: REP. PAUL C. BROUN
Ranking Member
Subcommittee on Investigations and Oversight



QUESTIONS FOR THE RECORD

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

September 16, 2010 hearing titled:

Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward

For Mr. Pamperin

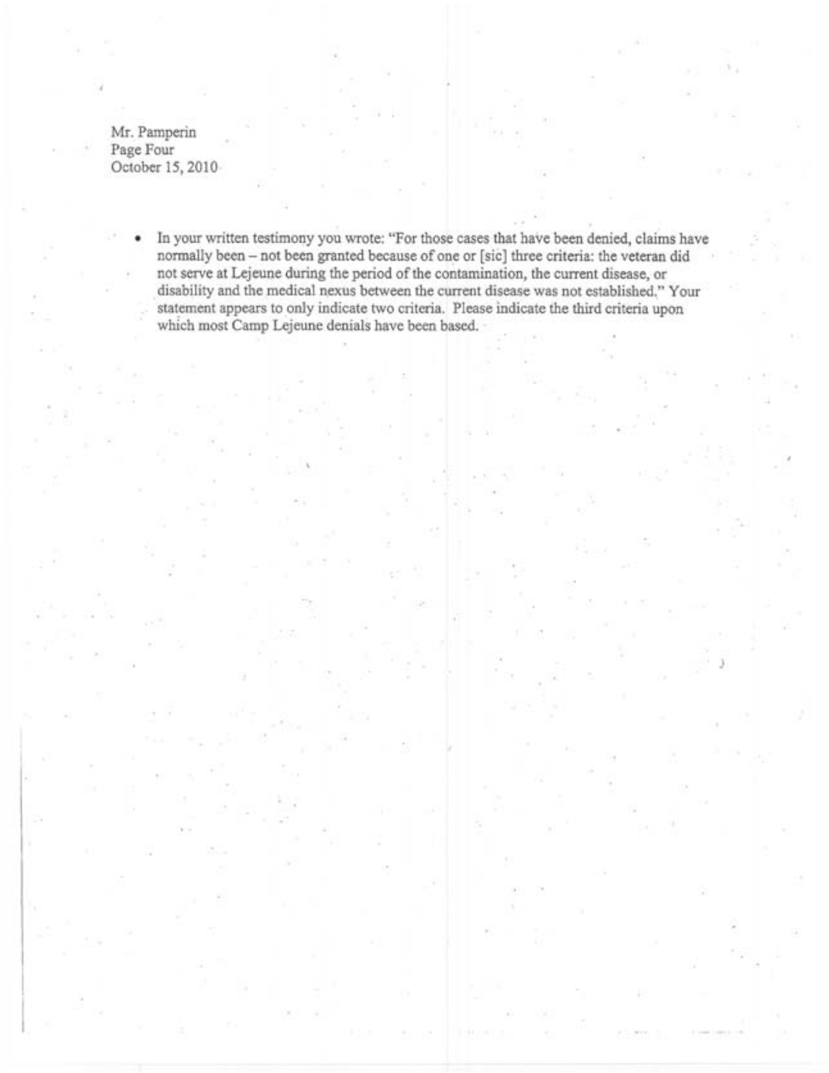
Question from Chairman Brad Miller (D-NC):

- Are you aware of any interagency review as part of the OMB testimony review process? If so, what agencies, that you are aware of, have reviewed your testimony?

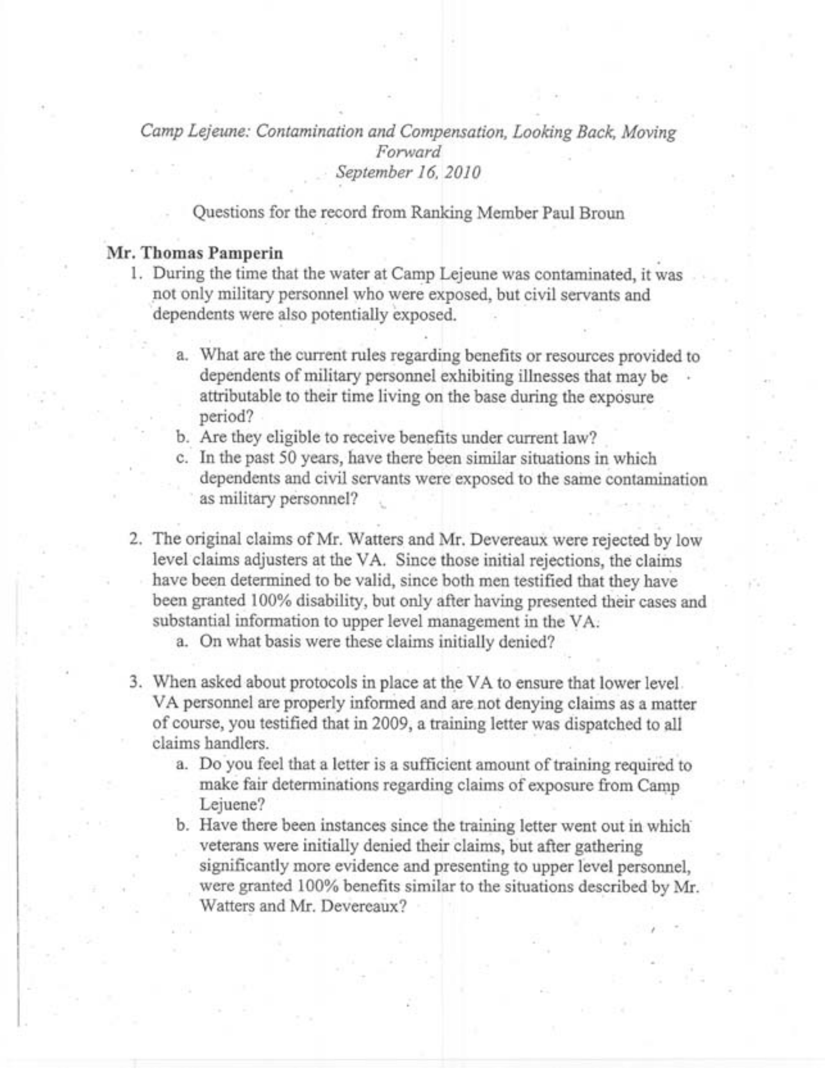
- Your testimony regarding the number of Camp Lejeune veterans compensated by VA due to their exposures to toxic chemicals in the drinking water supply was at odds with numbers provided to Subcommittee staff prior to the hearing. Please provide the Subcommittee with an accurate list of the number of Camp Lejeune veterans the VA has compensated due to toxic chemical exposures at the base, when these claims were granted and the proportion of the claim granted, i.e., 100-percent, 30-percent, etc.

- In addition, in your testimony you indicated that you did not know when the VA's Camp Lejeune Task Force would complete its work and submit its report to the Secretary of Veterans Affairs. However, prior to your testimony the Subcommittee staff was led to believe that the task force's work had already been completed and that it had already delivered its report to the Secretary. Please provide a clear response indicating the status of the task force's work, whether the task force has completed its report and recommendations to the VA Secretary and if so when this work was completed. If the task force has not yet completed its work, please indicate when the task force intends to complete its work and deliver its report to the Secretary if it has not done so already.

- At the hearing you stated that: "Establishing presumptive diseases [tied to exposures at Camp Lejeune] at this point would be premature." Was this assertion based upon recommendations by the VA's Camp Lejeune Task Force? What data does the VA believe it requires in order to establish "presumptive" health claims tied to Camp Lejeune?



- In your written testimony you wrote: "For those cases that have been denied, claims have normally been – not been granted because of one or [sic] three criteria: the veteran did not serve at Lejeune during the period of the contamination, the current disease, or disability and the medical nexus between the current disease was not established." Your statement appears to only indicate two criteria. Please indicate the third criteria upon which most Camp Lejeune denials have been based.



Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward
September 16, 2010

Questions for the record from Ranking Member Paul Broun

Mr. Thomas Pamperin

1. During the time that the water at Camp Lejeune was contaminated, it was not only military personnel who were exposed, but civil servants and dependents were also potentially exposed.
    a. What are the current rules regarding benefits or resources provided to dependents of military personnel exhibiting illnesses that may be attributable to their time living on the base during the exposure period?
    b. Are they eligible to receive benefits under current law?
    c. In the past 50 years, have there been similar situations in which dependents and civil servants were exposed to the same contamination as military personnel?

2. The original claims of Mr. Watters and Mr. Devereaux were rejected by low level claims adjusters at the VA. Since those initial rejections, the claims have been determined to be valid, since both men testified that they have been granted 100% disability, but only after having presented their cases and substantial information to upper level management in the VA.
    a. On what basis were these claims initially denied?

3. When asked about protocols in place at the VA to ensure that lower level VA personnel are properly informed and are not denying claims as a matter of course, you testified that in 2009, a training letter was dispatched to all claims handlers.
    a. Do you feel that a letter is a sufficient amount of training required to make fair determinations regarding claims of exposure from Camp Lejuene?
    b. Have there been instances since the training letter went out in which veterans were initially denied their claims, but after gathering significantly more evidence and presenting to upper level personnel, were granted 100% benefits similar to the situations described by Mr. Watters and Mr. Devereaux?

ANSWERS TO POST-HEARING QUESTIONS

Responses by Mr. Thomas J. Pamperin, Associate Deputy Under Secretary for Policy and Program Management, Veterans Benefits Administration, U.S. Department of Veterans Affairs

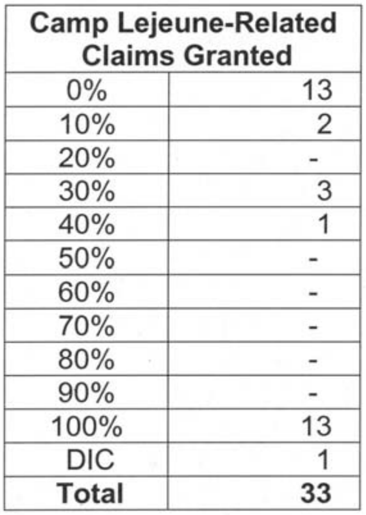
Questions submitted by Chairman Brad Miller

Q1. Are you aware of any interagency review as part of the OMB testimony review process? If so, what agencies, that you are aware of, have reviewed your testimony?

A1. OMB Circular A–19, "Legislative Coordination and Clearance," outlines the process by which all Executive Branch agencies provide testimony to and receive clearance from OMB as part of submitting reports, including testimony, to Congress. Section 8 outlines the interagency coordination process. As part of this hearing, we are aware of our testimony being coordinated with the Departments of Defense and Health and Human Services.

Q2. Your testimony regarding the number of Camp Lejeune veterans compensated by VA due to their exposures to toxic chemicals in the drinking water supply was at odds with numbers provided to Subcommittee staff prior to the hearing. Please provide the Subcommittee with an accurate list of the number of Camp Lejeune veterans that the VA has compensated due to toxic chemical exposures at the base, when their claims were granted, and the proportion of the claim granted, i.e. 100-percent, 30-percent, etc.

A2. Provided below is a table reflecting the results of VA's initial data search of those Camp Lejeune Veterans compensated between 1997 and 2010. VA is still reviewing its records, and will update the Committee should any substantial new findings occur as a result of this ongoing review.



Camp Lejeune-Related Claims Granted	
0%	13
10%	2
20%	-
30%	3
40%	1
50%	-
60%	-
70%	-
80%	-
90%	-
100%	13
DIC	1
Total	**33**

Q3. In addition, in your testimony you indicated that you did not know when the VA's Camp Lejeune Task Force would complete its work and submit its report to the Secretary of Veterans Affairs. However, prior to your testimony the Subcommittee staff was led to believe that the task force's work had already been completed and that it had already delivered its report to the Secretary. Please provide a clear response indicating the status of the task force's work, whether the task force has completed its report and recommendations to the VA Secretary and if so when this work was completed. If the task force has not yet completed its work, please indicate when the task force intends to complete its work and deliver its report to the Secretary if it has not done so already.

A3. Task Force recently acquired additional and significant information from CDC's Agency for Toxic Substances and Disease Registry (ATSDR). Based on this new information, the Task Force is re-evaluating its recommendations to the Secretary. We anticipate that the Task Force report will be finalized and presented to the Secretary by the end of January, 2011.

Q4. At the hearing you stated that: "Establishing presumptive diseases [tied to exposures at Camp Lejeune] at this point would be premature." Was this assertion based upon recommendations by the VA's Camp Lejeune Task Force? What data does the VA believe it requires in order to establish "presumptive" health claims tied to Camp Lejeune?

A4. VA's Task Force is currently re-evaluating its recommendations in light of recent information from ATSDR. This new information from ATSDR, as well as the June 2009 National Research Council report and other scientific information will serve as the basis for recommendations regarding data needs and presumptive service connections related to service at Camp Lejeune.

Q5. In your written testimony you wrote: "For those cases that have been denied, claims have normally been—not been granted because of one or [sic] three criteria: the veteran did not serve at Lejeune during the period of the contamination, the current disease, or disability and the medical nexus between the current disease was not established." Your statement appears to only indicate two criteria. Please indicate the third criteria upon which most Camp Lejeune denials have been based.

A5. Service connection for a disability related to service at Camp Lejeune requires that all three of the following criteria are met: (1) evidence that the Veteran served at Camp Lejeune during the period of water contamination, (2) evidence of a current chronic disease or disability, and (3) evidence providing a nexus or causal link between the current disability and the service at Camp Lejeune. Evidence of causation would likely come from a qualified medical professional who provides a rational scientific basis for establishing the nexus. However, such a nexus may be difficult to establish because there are unresolved issues related to the amount and duration of potential toxic exposure among the exposed Camp Lejeune Veteran population, as well as a lack of scientific certainty on what diseases may be associated with the drinking water contaminants.

Questions submitted by Representative Paul C. Broun

Q1. During the time that the water at Camp Lejeune was contaminated, it was not only military personnel who were exposed, but civil servants and dependents were also potentially exposed.

a. What are the current rules regarding benefits or resources provided to dependents of military personnel exhibiting illnesses that may be attributable to their time living on the base during the exposure period?

A1a. Congress authorizes VA to provide benefits, including compensation for disabilities resulting from service, to Veterans. Congress has not authorized disability compensation for family members and dependents of Veterans who develop disabilities related to living with the Veteran during the period of military service. This includes family members and dependents of Veterans who lived at Camp Lejeune.

b. Are they eligible to receive benefits under current law?

A1b. Surviving dependents of deceased Veterans who served at Camp Lejeune may be eligible to receive monthly payments for dependency and indemnity compensation if the Veteran's service-connected disability was a primary or secondary cause of death or if the Veteran's disability was rated at 100 percent disabling for 10 consecutive years immediately before the Veteran's death or for 5 consecutive years following separation from service.

Q2. The original claims of Mr. Watters and Mr. Deveraux were rejected by low level claims adjusters at the VA. Since those initial rejections, the claims have been determined to be valid, since both men testified that they have been granted 100% disability, but only after having presented their cases and substantial information to upper level management in the VA.

a. On what basis were these claims initially denied?

A2. Service connection for a disability related to service at Camp Lejeune requires: (1) evidence that the Veteran served at Camp Lejeune during the period of water contamination, (2) evidence of a current chronic disease or disability, and (3) evidence providing a nexus or link between the current disability and the service at Camp Lejeune. Regional Office personnel understand these requirements and adjudicate cases based on these criteria.

In the case of Mr. Devereaux's breast cancer, there was insufficient evidence of a nexus or causal link between the breast cancer and the service at Camp Lejeune presented with the initial claim. In the case of Mr. Watters, there was insufficient initial evidence of a medical association between exposure to contaminated water at Camp Lejeune and his renal cancer.

Q3. When asked about protocols in place at the VA to ensure that lower level VA personnel are properly informed and are not denying claims as a matter of course, you testified that in 2009, a training letter was dispatched to all claims handlers.

a. Do you feel that a letter is a sufficient amount of training required to make fair determinations regarding claims of exposure from Camp Lejeune?

A3a. Regional Office (RO) personnel were alerted to the Camp Lejeune situation during a nationwide broadcast in June 2009, when they were asked to adjudicate these claims based on the evidence available in each individual case. A training letter followed on April 26, 2010, which outlined details of developing evidence and ordering medical examinations for Camp Lejeune-related claims.

In an effort to ensure consistency in the adjudication of these claims and establish a statistical database of information, VBA will consolidate Camp Lejeune-related claims to the Louisville Regional Office. Policies and procedures for implementing this decision, including training of claims personnel, are scheduled to be completed by January 2011. These efforts will ensure that disability claims based on service at Camp Lejeune receive fair and consistent evaluations and determinations.

b. Have there been instances since the training letter went out in which veterans were initially denied their claims, but after gathering significantly more evidence and presenting to upper level personnel, were granted 100% benefits similar to the situations described by Mr. Watters and Mr. Devereaux?

A3b. VA does not track initial service connection denials for claims based on service at Camp Lejeune that are later re-adjudicated and granted. Therefore, we are unable to determine at this time if a subsequent rating decision grants 100 percent disability or any other disability rating percentage. A denied claim may be subsequently granted upon appellate review or by the submission of new evidence sufficient to warrant service connection.

Appendix 2:

ADDITIONAL MATERIAL FOR THE RECORD

U.S. DEPARTMENT OF THE NAVY U.S. MARINE CORPS CAMP LEJEUNE DOCUMENTS FOR THE RECORD

DOCUMENTS FOR THE RECORD

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

Camp Lejeune: Contamination and Compensation,
Looking Back, Moving Forward

September 16, 2010 – 10:00 a.m. to 12:00 p.m.
2138 Rayburn House Office Building

U.S. DEPARTMENT OF THE NAVY
U.S. MARINE CORPS
CAMP LEJEUNE
DOCUMENTS

DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington 25, D.C.

BUMED 6240.3B
BUMED-7223-lss
30 September 1963

BUMED INSTRUCTION 6240.3B

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Standards for potable water

Ref: (a) ONMINST 5711.9 dated 16 May 1958 (NOTAL)
(b) BUMEDINST 5711.2 dated 30 January 1959 (NOTAL)

1. **Purpose.** To establish standards for water for drinking and culinary purposes throughout the Naval Establishment.

2. **Cancellation.** BUMED Instruction 6240.3A is canceled.

3. **Background**

a. **Policy.** The Department of Defense has established the policy of compliance by the Military Departments with United States Public Health Service Drinking Water Standards, as may be modified by the Medical Services of the Departments, or as may be modified by competent authority for purposes of international agreement.

b. **International agreement.** Naval Tripartite Standardization Agreement ABC-NAVY-STD-23 was promulgated by references (a) and (b). The object of the agreement is to provide the United States Navy, the Royal Navy, and the Royal Canadian Navy assurance that drinking and culinary water delivered to each other's ships from installations under their cognizance meets certain minimum standards of quality.

4. **Quality Standards.** The standards for bacteriological quality, physical and chemical characteristics, and radioactivity shall be those in "Public Health Service Drinking Water Standards, 1962." Department of Health, Education, and Welfare. The Standards, as modified, may be found in NAVMED P-5010-5, "Water Supply Ashore," available through the Navy Supply System.

5. **Definition of Terms.** The following terms are defined for clarification in interpretation of standards:

a. **Adequate protection by natural means** involves one or more of the following processes of nature that produce water consistently meeting the requirements of these Standards: dilution, storage, sedimentation, sunlight, aeration, and the associated physical and biological processes which tend to accomplish natural purification in surface waters and, in the case of ground waters, the natural purification of water by infiltration through soil and percolation through underlying material and storage below the ground water table.

b. **Adequate protection by treatment** means any one or any combination of the controlled processes of coagulation, sedimentation, absorption, filtration, disinfection, or other processes which produce a water consistently meeting the requirements of these standards. This protection also includes processes which are appropriate to the source of supply; works which are of adequat capacity to meet maximum demands without creating health hazards, and which are located, designed, and constructed to eliminate or prevent pollution; and conscientious operation by well-trained and competent personnel whose qualifications are commensurate with the responsibilities of the position.

c. **The coliform group** includes all organisms considered in the coliform group as set forth in Standard Methods for the Examination of Water and Wastewater, current edition, prepared and published jointly by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation.

d. **Health hazards** mean any conditions, devices, or practices in the water supply system and its operation which create, or may create, a danger to the health and well-being of the water consumer. An example of a health hazard is a structural defect in the water supply system, whether of location, design, or construction, which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources.

e. **Pollution,** as used in these Standards, means the presence of any foreign substance (organic, inorganic, radiological, or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water.

f. **The standard sample** for the bacteriological test shall consist of:

(1) For the bacteriological fermentation tube test, five standard portions of either:

(a) 10 milliliters
(b) 100 milliliters

Cancelled by -3C of 8/25/72

(2) For the membrane filter technique, not less than 50 milliliters.

g. **Water supply system** includes the works and auxiliaries for collection, treatment, storage, and distribution of the water from the sources of supply to the freeflowing outlet of the ultimate consumer.

6. Source and Protection

a. The water supply should be obtained from the most desirable source which is feasible, and effort should be made to prevent or control pollution of the source. If the source is not adequately protected by natural means, the supply shall be adequately protected by treatment.

b. Frequent sanitary surveys shall be made of the water supply system to locate and identify health hazards which might exist in the system.

c. Approval of water supplies shall be dependent in part upon:

(1) Enforcement of rules and regulations to prevent development of health hazards:

(2) Adequate protection of the water quality throughout all parts of the system, as demonstrated by frequent surveys:

(3) Proper operation of the water supply system under the responsible charge of personnel whose qualifications are acceptable to the Bureau of Yards and Docks or the Bureau of Ships, as appropriate:

(4) Adequate capacity to meet peak demands without development of low pressures or other health hazards; and

(5) Record of laboratory examinations showing consistent compliance with the water quality requirements of these Standards.

7. Standards. The limits listed below are generally those contained in "Public Health Service Drinking Water Standards, 1962." For sampling procedures and techniques, refer to NAVMED P-5010-5.

a. **Bacteriological quality: limits.** The presence of organisms of the coliform group as indicated by samples examined shall not exceed the following limits:

(1) When 10 ml. standard portions are examined, not more than 10 percent in any month shall show the presence of the coliform group. The presence of the coliform group in three or more 10 ml. portions of a standard sample shall not be allowable if this occurs:

(a) In two consecutive samples;
(b) In more than one sample per month when less than 20 are examined per month; or
(c) In more than five percent of the samples when 20 or more are examined per month.

When organisms of the coliform group occur in three or more of the 10 ml. portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(2) When 100 ml. standard portions are examined, not more than 60 percent in any month shall show the presence of the coliform group. The presence of the coliform group in all five of the 100 ml. portions of a standard sample shall not be allowable if this occurs:

(a) In two consecutive samples;
(b) In more than one sample per month when less than five are examined per month; or
(c) In more than 20 percent of the samples when five or more are examined per month.

When organisms of the coliform group occur in all five of the 100 ml. portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(3) When the membrane filter technique is used, the arithmetic mean coliform density of all standard samples examined per month shall not exceed one per 100 ml. Coliform colonies per standard sample shall not exceed 3/50 ml., 4/100 ml., 7/200 ml., or 13/500 ml. in:

(a) Two consecutive samples;
(b) More than one standard sample when less than 20 are examined per month; or
(c) More than five percent of the standard samples when 20 or more are examined per month.

When coliform colonies in a single standard sample exceed the above values, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

b. Physical characteristics: limits. Drinking water should contain no impurity which would cause offense to the sense of sight, taste, or smell. Under general use, the following limits should not be exceeded:

Turbidity	5 units
Color	15 units
Threshold Odor Number	3

c. Chemical characteristics: limits. Drinking water shall not contain impurities in concentrations which may be hazardous to the health of the consumers. It should not be excessively corrosive to the water supply system. Substances used in its treatment shall not remain in the water in concentrations greater than required by good practice. Substances which may have deleterious physiological effect, or for which physiological effects are not known, shall not be introduced into the system in a manner which would permit them to reach the consumer.

(1) The following chemical substances should not be present in a water supply in excess of the listed concentrations where, in the judgment of the Bureau of Yards and Docks and the Bureau of Medicine and Surgery, other more suitable supplies are or can be made available.

Substance	Concentration in mg/1 (ppm)
Alkyl Benzene Sulfonate (ABS)	0.5
*Antimony (Sb)	0.01
Arsenic (As)	0.01
Chloride (Cl)	250.
Copper (Cu)	1.
Carbon Chloroform Extract (CCE)	0.2
Cyanide (CN)	0.01
Fluoride (F)	(See (3))
Iron (Fe)	0.3
Manganese (Mn)	0.05
Nitrate[1] (No$_3$)	45.
Phenols	0.001
Sulfate (SO$_4$)	250.
Total Dissolved Solids	500.
Zinc (Zn)	5.

(2) The presence of the following substances in excess of the concentrations liste shall constitute grounds for rejection of the supply:

Substance	Concentrati in mg/1 (pp
*Antimony (Sb)	0.05
Arsenic (As)	0.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Chromium (Hexavalent) (Cr^{+6})	0.05
Cyanide (CN)	0.2
Fluoride (F)	(See (3))
Lead (Pb)	0.05
Selenium (Se)	0.01
Silver (Ag)	0.05

(3) *Fluoride.* When fluoride is naturally present in drinking water, the concentration should not average more than the appropriate upper limit in the following Table I. Presence fluoride in average concentrations greater tha two times the optimum values in Table I shall constitute grounds for rejection of the supply. When fluoridation (supplementation of fluoride drinking water) is practiced, the average fluor concentration shall be kept within the upper a lower control limits in Table I.

TABLE I

Annual average of maximum daily air temperatures[2]	Recommended control limits—Fluoride concentr tions in mg/1 (ppm)		
	Lower	Optimum	Uppe
50.0 - 53.7	0.9	1.2	1.7
53.8 - 58.3	0.8	1.1	1.5
58.4 - 63.8	0.8	1.0	1.3
63.9 - 70.6	0.7	0.9	1.2
70.7 - 79.2	0.7	0.8	1.0
79.3 - 90.5	0.6	0.7	0.8

d. Radioactivity: limits.

(1) The effects of human radiation exposure are viewed as harmful and any unnecessar exposure to ionizing radiation should be avoide

---

[1] In areas in which the nitrate content of water is known to be in excess of the listed concentration, the public should be warned of the potential dangers of using the water for infant feeding.

* Not contained in Drinking Water Standards but this limit was determined by the Public Health Service and the Bureau of Medicine and Surgery.

* Not contained in Drinking Water Standards this limit was determined by the Public Healt Service and the Bureau of Medicine and Surger

[2] Based on temperature data obtained for a minimum of five years.

Approval of water supplies containing radioactive materials shall be based upon the judgment that the radioactivity intake from such water supplies when added to that from all other sources is not likely to result in an intake greater than the radiation protection guidance[3] recommended by the Federal Radiation Council and approved by the President. Water supplies shall be approved without further consideration of other sources of radioactivity intake of Radium-226 and Strontium-90 when the water contains these substances in amounts not exceeding 3 and 10 μμc/liter, respectively. When these concentrations are exceeded, a water supply shall be approved by the certifying authority if surveillance of total intakes of radioactivity from all sources indicates that such intakes are within the limits recommended by the Federal Radiation Council for control action

(2) In the known absence[4] of Strontium-90 and alpha emitters, the water supply is acceptable when the gross beta concentrations do not exceed 1,000μμc/liter. Gross beta concentrations in excess of 1,000 μμc/liter shall be grounds for rejection of supply except when more complete analyses indicate that concentrations of nuclides are not likely to cause exposures greater than the Radiation Protection Guides as approved by the President on recommendation of the Federal Radiation Council.

8. **Technical Assistance.** Assistance with potable water problems may be requested from the following:

a. Preventive Medicine Units, in accordance with BUMED Instruction 6200.3A of 2 July 1957, Subj: U.S. Navy Preventive Medicine Units.

b. Bureau of Yards and Docks' Field Engineering Offices, in accordance with BUDOCKS Instruction 5450.19A of 21 September 1962, Subj: Sanitary Engineering Responsibilities of the Bureau of Yards and Docks Field Engineering Offices.

A. S. CHRISMAN
Deputy and Assistant Chief

Distribution:
SNDL Parts 1 and 2
Marine Corps List E less: 1050/1070/1080/2000/
6200/7150/7200/7352/
7503/7505/7506/8120/
8121/8122/8180

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[3] The Federal Radiation Council, in its Memorandum for the President, Sept. 13, 1961, recommended that "Routine control of useful applications of radiation and atomic energy should be such that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II (20μμc/day of Radium-226 and 200μμc/day of Strontium-90)."

[4] Absence is taken here to mean a negligibly small fraction of the above specific limits, where the limit for unidentified alpha emitters is taken as the listed limit for Radium-226.

GRAINGER LABORATORIES, INC.
LETTER OF AUGUST 10, 1982

ALSO ATTACHED ARE

MEMORANDUM FOR THE RECORDS WRITTEN BY SUPERVISORY CHEMIST
DATED MAY 25, 1982 AND JULY 30, 1982

MEMORANDUM WRITTEN BY SUPVY CHEMIST TO SUPVY ECOLOGIST
DATED AUGUST 19, 1982

GRAINGER LABORATORIES
INCORPORATED
ANALYTICAL AND CONSULTING CHEMISTS
709 West Johnson Street • Raleigh, North Carolina 27603
(919) 828-3360

ANALYTICAL LABORATORY
Environment Analysis
Construction Materials
Identification of Unknowns
Agriculture
Fuels
Textiles
Chemicals
Hazardous Waste

CONSULTATION
Metallurgical Services
Pollution Abatement
Process Development
Quality Control
Methods Development
Special Investigation
Pesticides
RCRA

August 10, 1982
82-4471

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Discussion:

Previously all samples from site TT and HP presented difficulties in performing the monthly Trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejuene personnel.

Results:

The identity of the contaminant in the well field represented by samples 206 and 207 was suspected to be Tetrachloroethylene. This was confirmed by two analytical techniques and the results were 76 μg/l and 82 μg/l for samples 206 and 207 respectively.. Sample 86 from May 27, 1982 was reanalyzed as a part of our study. Sample 86 was from site TT and contained 80 μg/l tetrachloroethylene.

Samples 208 and 209 were also analyzed by the same analytical techniques. The magnitude of the contamination was not as great as previously observed from this same sampling point. Upon reanalyzing sample 120 from site HP May 27, 1982 , Trichloroethylene was identified and quantitated at 1400 μg/l. A lesser amount of Tetrachloroethylene was confirmed at 15 μg/l. Samples 208 and 209 contained 19 μg/l and 21 μg/l Trichloroethylene respectively; Tetrachloroethylene was not detected.

Prior to this report, the samples from July 28, 1982 from site HP were analyzed. Traces of both solvents were found in this set. Though not quantitated, the level of Trichloroethylene seems to be in the range of that which was found in samples 208 and 209. The sample which showed the most contamination relative to the others was 205. Also sample 168 from site TT on July 28, 1982 was analyzed and shown to contain 104 µg/l Tetrachloroethylene.

Conclusion:

Tetrachloroethylene was identified as the contaminant in the well field coded "TT". Its concentration seems relatively stable over the period in which it has been examined. It was confirmed that the well field coded "HP" has shown contamination by Trichloroethylene and Tetrachloroethylene. These levels have been variable over the per studied and are now at significantly lower levels than when first encountered. The following table summarizes the findings:

Sample	Date Taken	Site Code	Tri chloroethylene	Tetra-chloroethylene
206	7-27-82	TT	-	76
207	7-27-82	TT	-	82
86	5-27-82	TT	-	80
168	7-28-82	TT	-	104
208	7-27-82	HP	19	<1
209	7-27-82	HP	21	<1
120	5-27-82	HP	1400	15
205	7-28-82	HP	No Data	1.0

Bruce A. Babson

Bruce A. Babson
Chemist

BAB/ab
Customer #92400

Date: 25 May 1982

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

Subj: Phone Conversation with Mike Hargett on 6 May 1982

1. On 6 May 1982, Mike Hargett, of Grainger Labs called to say that during the analysis of April's 1982 samples they had some interferences. He said that peaks for Perclene and Trichloroethylene (TCE), which are synthetic organic cleaning solvents were found in samples #001-005 (Tarawa Terrace Water System) and #037-041 (Hadnot Point Water System). He also stated that the TCE peak for the Hadnot Point samples overlapped the Bromodichloromethane peak. He asked if a less than value would be acceptable since that is all that could be read. I stated that that would be fine. He also stated that no mention would be made of the extra peaks except for the less than value on the report.

2. Right after I talked with Mike Hargett, I notified Danny Sharpe, Supervisory Ecologist, of Grainger's findings. The findings were then sent up the chain of command to Billy Elston, Deputy Base Maintenaance Officer, and over to the Utilities Director, Fred Cone.

3. Later on 6 May 1982, I called Mike Hargett back to discuss cost of analysis. Analysis would cost $75 for both parameters per sample.

4. On 14 May 1982, while briefing Col Millice and LtCol Fritzgerald on April's trihalomethane analysis, it appeared to me that they had not been informed about the findings. I didn't inform them.

Elizabeth A. Betz
Supervisory Chemist

Date: 30 July 1982

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

Subj: Raw and Treated Sampling at Tarawa Terrace and Hadnot Point Water Treatment Plants

1. On 28 July 1982, Gaines Huneycutt and Elizabeth Betz collected a raw and a treated water sample at the Water Treatment Plants for Hadnot Point and Tarawa Terrace. The reason for the sampling was that during the analysis of the Base's THM samples by Grainger Labs, Grainger had come accross some interferring peaks cause by the presence of trichloroethylene and perclene(synthetic organic cleaning solvents) in the samples from Tarawa Terrace and Hadnot Point.

2. Below is listed the sample numbers and locations of the samples.

Sample #	Location	Time
206 A&B	TT WTP, Bldg STT-38, Raw	1000
207 A&B	TT WTP, Bldg STT-39A, Treated	1005
208 A&B	HP WTP, Bldg 20(Man-hole)Raw	1055
209 A&B	HP WTP, Bldg 20, Treated	1100

3. The sample containers had arrived in an ice chest from Grainger. Mike Hargett had instructed that the samples had to be sent back to Grainger by bus and on ice since the solvents were highly volatile. A DD1348/1 was prepared by Mr. Richardson of Base Maintenance Property Office. At approximately 1130, the samples were carried to Freight Traffic, who had arranged to take them to the bus station for the 1400 bus to Raleigh. Mike Hargett was called and notified to have someone pick up the samples at approximately 1730 at the Raleigh bus station.

4. During a phone conversation with Mike Hargett on 30 July 1982, it was learned that the samples had been received.

Elizabeth A. Betz

Elizabeth A. Betz
Supervisory Chemist

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

1. On 6 May 1982, Mike Hargett, of Grainger Labs, called and informed me that on 3 May 1982, while they were analyzing the first set of Trihalomethane samples received from us, interferences possibly from chlorinated hydrocarbons hindered analysis of samples from two systems, Tarawa Terrace and Hadnot Point.

2. It was determined that raw and treated samples from the treatment plants for the two systems would be taken for analysis of the interferring chlorinated hydrocarbons. On 28 July 1982, a raw water sample, #206, and a treated water sample, #207, were taken at the Tarawa Terrace water treatment plant. A raw water sample, #208, and a treated water sample, #209, were taken at the Hadnot Point water treatment plant, on 28 July 1982. The Trihalomethane samples for July were also taken on 28 July 1982, for these two systems. In Grainger's letter, of 10 August 1982, they erroneous report the samplessas taken on 27 July 1982, they were collected and shipped on 28 July 1982.

3. Analysis of the above samples and some Grainger had preserved showed that in the Tarawa Terrace water treatment plant and system, the interferring chlorinated hydrocarbon is tetrachloroethylene, or otherwise known as perchloroethylene. Tetrachloroethylene is used as a dry cleaning and degreasing solvent, and heat-transfer medium, Analysis of the Hadnot Point water treatment plant and system samples showed Trichloroethylene and low levels of tetrachloroethylene. Trichloroethylene is used primarily as a metal degreaser. It is also used as a dry-cleaning solvent and a type of pesticide, fumigant.

4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

5. Tetrachloroethylene, in high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for tetrachloroethylene are 2300 ug/l for 1-day, 175 ug/l for 10-days, and 20 ug/l for longer-term where drinking water is the only source of exposure. On 9 April 1980, EPA came out with a Suggested Action Guidance on Tetrachloroethylene. This guidance was a result of possible tetrachloroethylene contamination of drinking water

where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/l (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/l (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/l.

6. Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethanes), at high levels , has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for trichloroethylene were determined to be 2 mg/l for 1-day, 0.2 mg/l for 10-day, and 75 ug/l for a chronic snarl. There is no Suggested Action Guidance on trichloroethylene.

7. Below is a table of the results received from Grainger labs.

Sample #	Sample Date	WTP	Sample Site	_chloroethylene, ug/l Tri-	 Tetra-
86 168	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data	100
208	7-28-82	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

8. The level of tetrachloroethylene for the Tarawa Terrace system samples averaged 0.09 mg/l, which exceeded the recommended level of 0.04 mg/l. The levels do not vary significantly between the raw and treated samples. The raw and treated samples were taken at the plant where the waeer had already traveled some distance in pipes. Therefore, with no significant difference between raw and treated samples and the high average of 0.09 mg/l, I would believe the tetrachloroethylene contamination is possibly do to the use of coated A/C pipe in the raw water lines at Tarawa Terrace.. Tetrachloroethylene, in the Hadnot Point system samples is at trace levels and well under recommended levels.

9. The level of trichloroethylene, at Hadnot Point, is presently averaging 20 ug/l, which is below all three recommended snarls; 1-day, 10-day, and chronic. No explaination is offered for the 1400 ug/l level on 27 May 1982, or why it is now averaging only 20 ug/l.

CLW

Elizabeth A. Betz
Supervisory Chemist

0126

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

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4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

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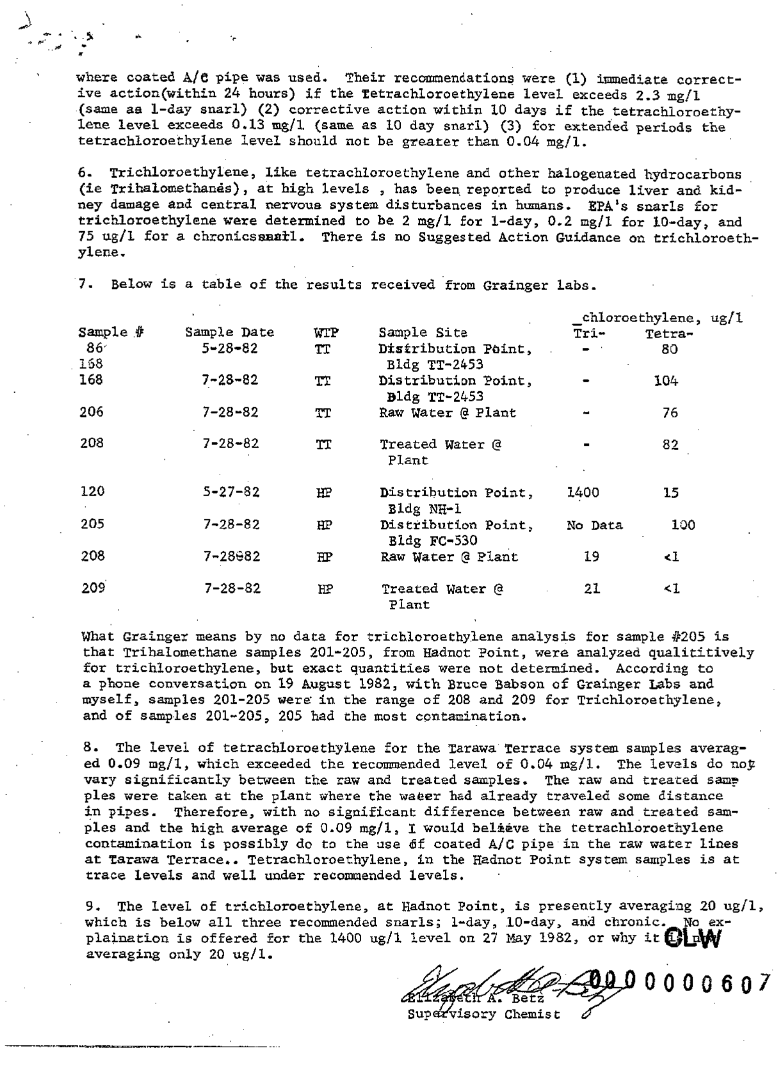
OLW



where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/l (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/l (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/l.

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7. Below is a table of the results received from Grainger labs.

				_chloroethylene, ug/l	
Sample #	Sample Date	WTP	Sample Site	Tri-	Tetra-
86 168	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data	100
208	7-28982	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

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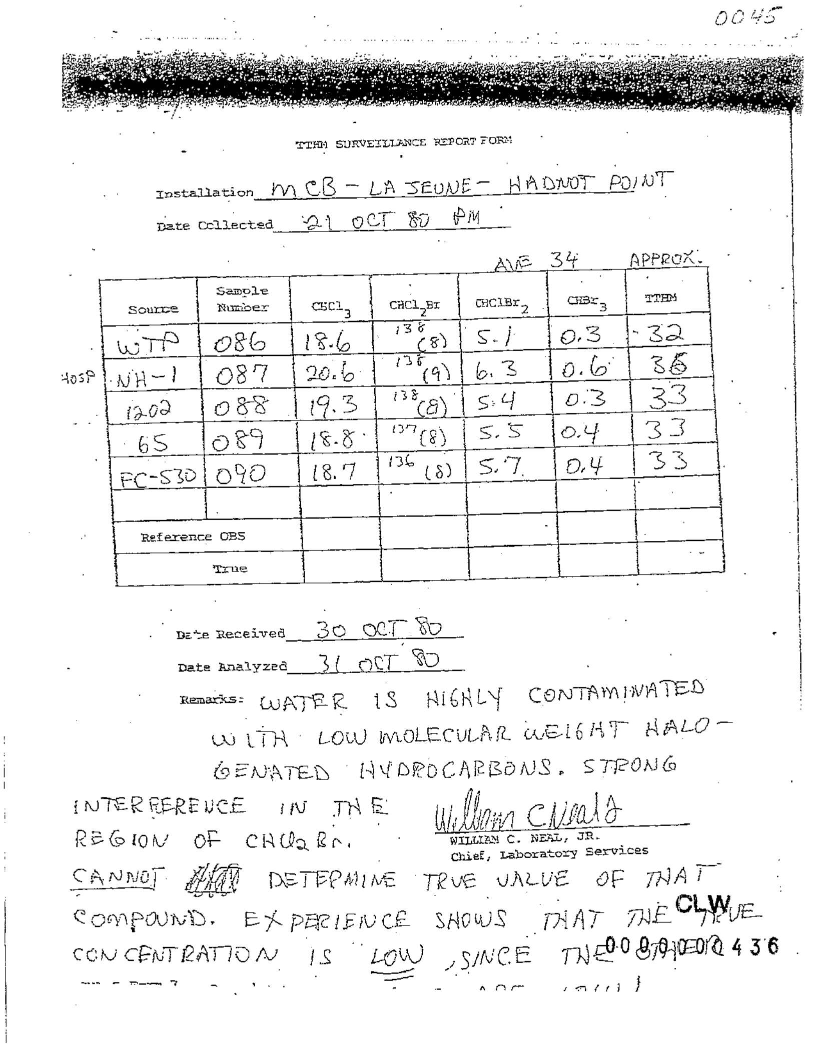
Elizabeth A. Betz
Elizabeth A. Betz
Supervisory Chemist

Special Testing of
TT + HP plants for
Trichloroethylene & Tetrachloroethylene
Both within limits. Recommend
sending Data to Maint Div.



0045

[redacted]

TTHM SURVEILLANCE REPORT FORM

Installation MCB - LA JEUNE - HADNOT POINT

Date Collected 21 OCT 80 PM

AVE 34 APPROX.

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	TTHM
WTP	086	18.6	138 (8)	5.1	0.3	32
HOSP NH-1	087	20.6	138 (9)	6.3	0.6	36
1202	088	19.3	138 (8)	5.4	0.3	33
65	089	18.8	137 (8)	5.5	0.4	33
FC-530	090	18.7	136 (8)	5.7	0.4	33
Reference OBS						
True						

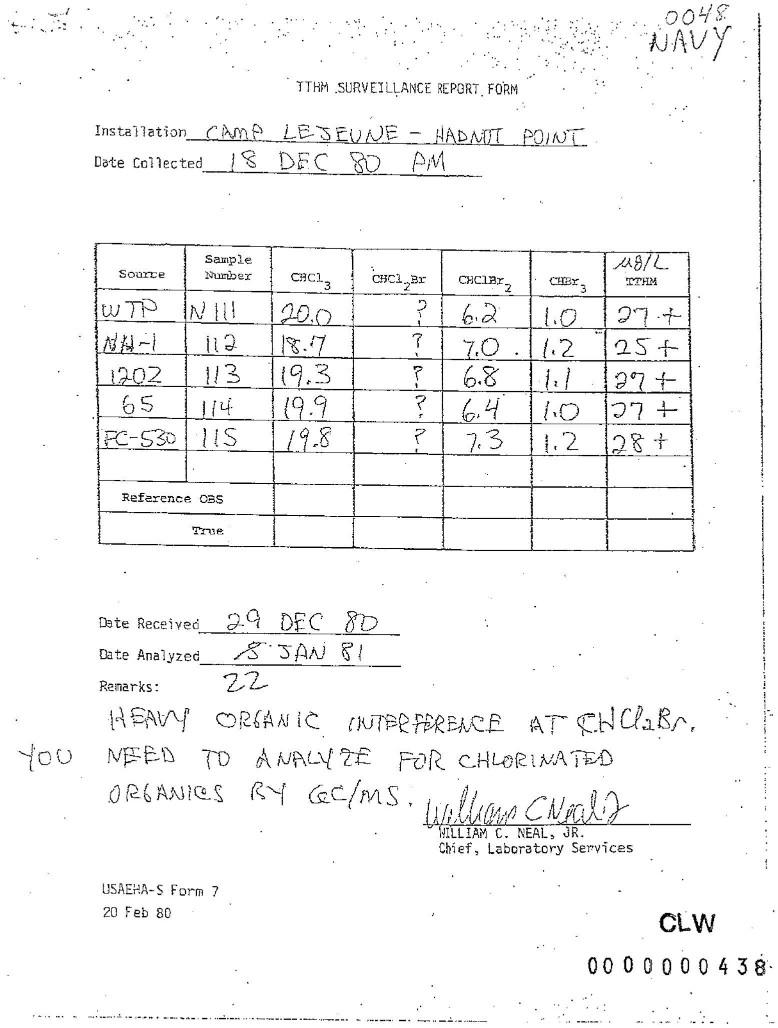
Date Received 30 OCT 80

Date Analyzed 31 OCT 80

Remarks: WATER IS HIGHLY CONTAMINATED WITH LOW MOLECULAR WEIGHT HALOGENATED HYDROCARBONS. STRONG INTERFERENCE IN THE REGION OF $CHCl_2Br$.

William C Neal Jr
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

CANNOT DETERMINE TRUE VALUE OF THAT COMPOUND. EXPERIENCE SHOWS THAT THE TRUE CONCENTRATION IS LOW, SINCE THE [illegible]



0048
NAVY

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LEJEUNE - HADNOT POINT

Date Collected 18 DEC 80 PM

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	µg/L TTHM
WTP	N 111	20.0	?	6.2	1.0	27 +
NH-1	112	18.7	?	7.0	1.2	25 +
1202	113	19.3	?	6.8	1.1	27 +
65	114	19.9	?	6.4	1.0	27 +
FC-530	115	19.8	?	7.3	1.2	28 +
Reference OBS						
True						

Date Received 29 DEC 80

Date Analyzed 8 JAN 81

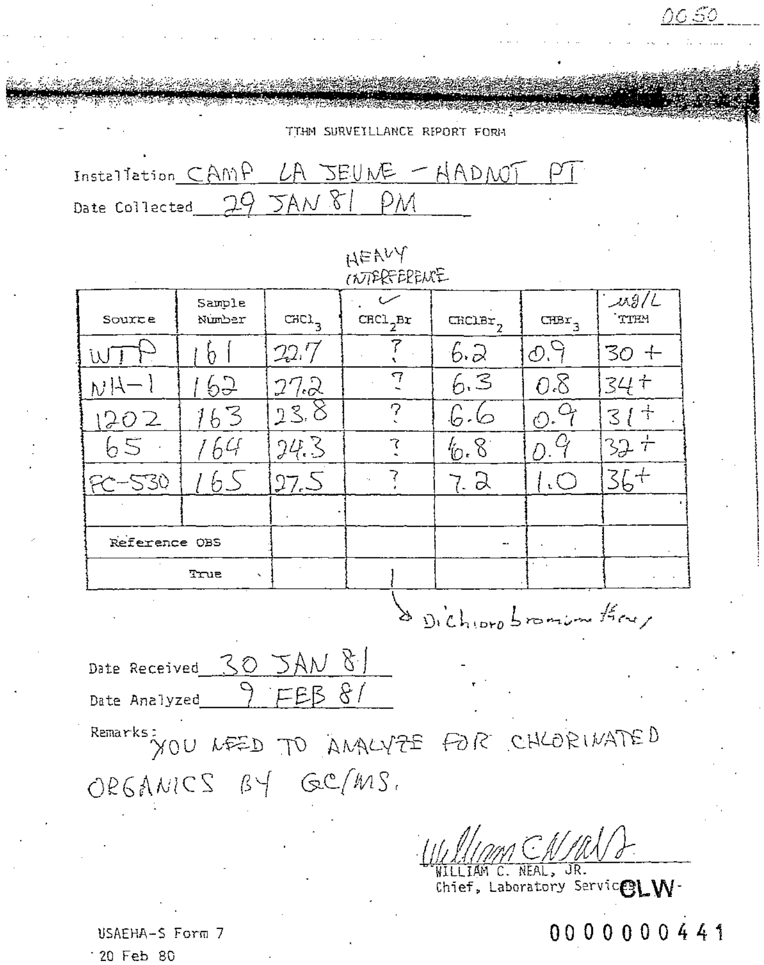
Remarks: 22

HEAVY ORGANIC INTERFERENCE AT $CHCl_2Br$. YOU NEED TO ANALYZE FOR CHLORINATED ORGANICS BY GC/MS.

William C Neal Jr

WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80



0050

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LA JEUNE - HADNOT PT

Date Collected 29 JAN 81 PM

Source	Sample Number	$CHCl_3$	HEAVY INTERFERENCE ✓ $CHCl_2Br$	$CHClBr_2$	$CHBr_3$	µg/L TTHM
WTP	161	22.7	?	6.2	0.9	30 +
NH-1	162	27.2	?	6.3	0.8	34+
1202	163	23.8	?	6.6	0.9	31+
65	164	24.3	?	6.8	0.9	32+
FC-530	165	27.5	?	7.2	1.0	36+
Reference OBS						
True						

→ Dichlorobromomethane

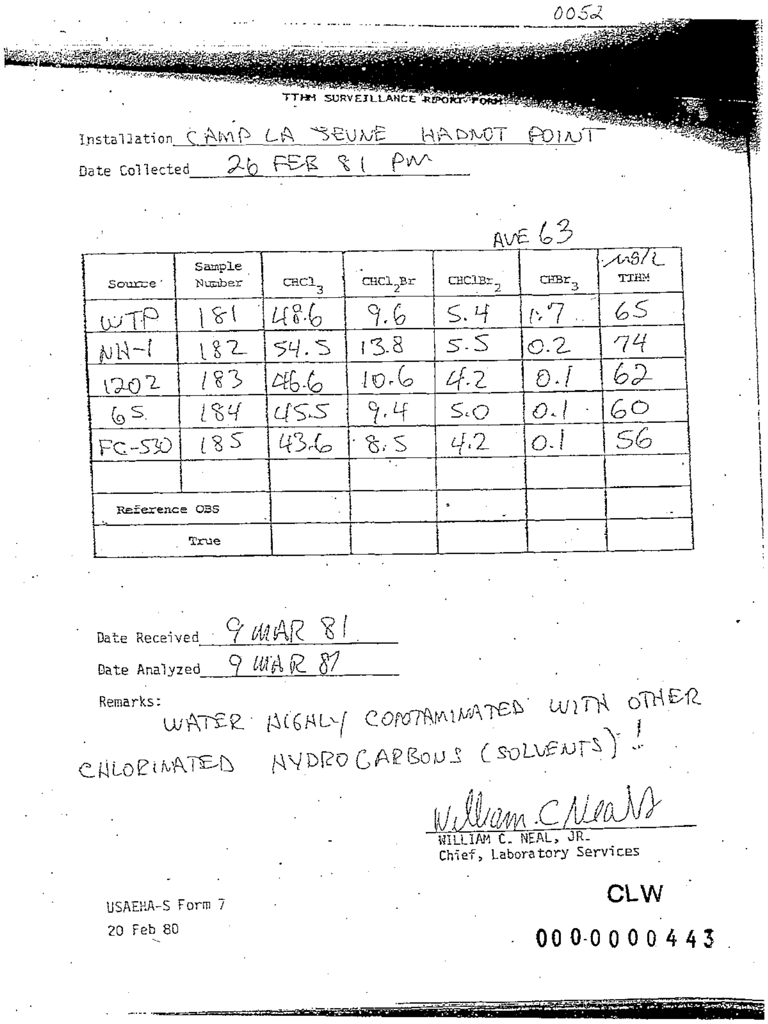
Date Received 30 JAN 81

Date Analyzed 9 FEB 81

Remarks: YOU NEED TO ANALYZE FOR CHLORINATED ORGANICS BY GC/MS.

William C Neal Jr
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80



0052

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LA JEUNE HADNOT POINT

Date Collected 26 FEB 81 PM

AVE 63

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	μg/L TTHM
WTP	181	48.6	9.6	5.4	1.7	65
NH-1	182	54.5	13.8	5.5	0.2	74
1202	183	46.6	10.6	4.2	0.1	62
65	184	45.5	9.4	5.0	0.1	60
FC-530	185	43.6	8.5	4.2	0.1	56
Reference OBS						
True						

Date Received 9 MAR 81

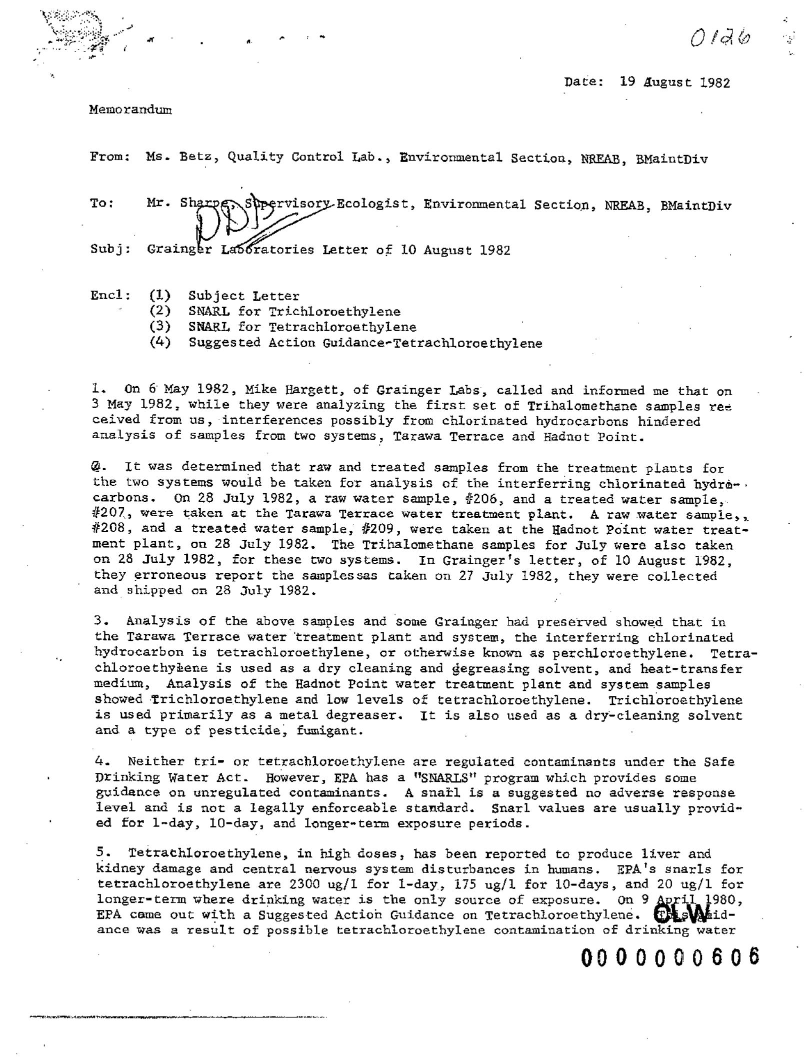
Date Analyzed 9 MAR 81

Remarks:

WATER HIGHLY CONTAMINATED WITH OTHER CHLORINATED HYDROCARBONS (SOLVENTS)!

William C Neal Jr
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80



0126

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

1. On 6 May 1982, Mike Hargett, of Grainger Labs, called and informed me that on 3 May 1982, while they were analyzing the first set of Trihalomethane samples received from us, interferences possibly from chlorinated hydrocarbons hindered analysis of samples from two systems, Tarawa Terrace and Hadnot Point.

2. It was determined that raw and treated samples from the treatment plants for the two systems would be taken for analysis of the interferring chlorinated hydrocarbons. On 28 July 1982, a raw water sample, #206, and a treated water sample, #207, were taken at the Tarawa Terrace water treatment plant. A raw water sample, #208, and a treated water sample, #209, were taken at the Hadnot Point water treatment plant, on 28 July 1982. The Trihalomethane samples for July were also taken on 28 July 1982, for these two systems. In Grainger's letter, of 10 August 1982, they erroneous report the samplessas taken on 27 July 1982, they were collected and shipped on 28 July 1982.

3. Analysis of the above samples and some Grainger had preserved showed that in the Tarawa Terrace water treatment plant and system, the interferring chlorinated hydrocarbon is tetrachloroethylene, or otherwise known as perchloroethylene. Tetrachloroethylene is used as a dry cleaning and degreasing solvent, and heat-transfer medium, Analysis of the Hadnot Point water treatment plant and system samples showed Trichloroethylene and low levels of tetrachloroethylene. Trichloroethylene is used primarily as a metal degreaser. It is also used as a dry-cleaning solvent and a type of pesticide, fumigant.

4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

5. Tetrachloroethylene, in high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for tetrachloroethylene are 2300 ug/l for 1-day, 175 ug/l for 10-days, and 20 ug/l for longer-term where drinking water is the only source of exposure. On 9 April 1980, EPA came out with a Suggested Action Guidance on Tetrachloroethylene. This guidance was a result of possible tetrachloroethylene contamination of drinking water

where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/l (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/l (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/l.

6. Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethanes), at high levels , has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for trichloroethylene were determined to be 2 mg/l for 1-day, 0.2 mg/l for 10-day, and 75 ug/l for a chronicsnarl. There is no Suggested Action Guidance on trichloroethylene.

7. Below is a table of the results received from Grainger labs.

Sample #	Sample Date	WTP	Sample Site	_chloroethylene, ug/l	
				Tri-	Tetra-
86 168	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data	100
208	7-28-82	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

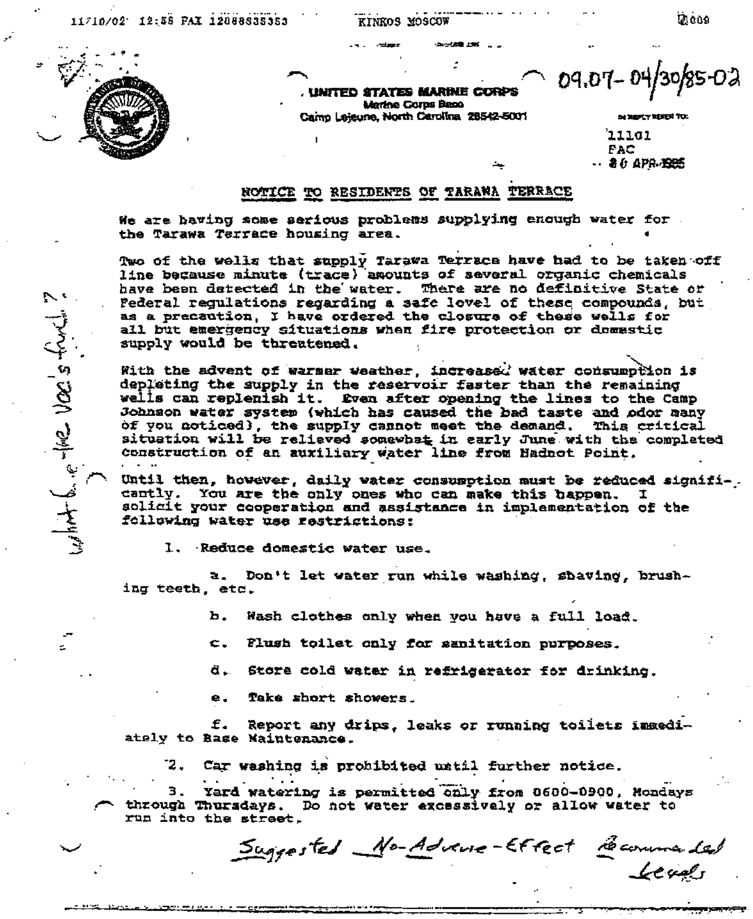
What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

8. The level of tetrachloroethylene for the Tarawa Terrace system samples averaged 0.09 mg/l, which exceeded the recommended level of 0.04 mg/l. The levels do not vary significantly between the raw and treated samples. The raw and treated samples were taken at the plant where the water had already traveled some distance in pipes. Therefore, with no significant difference between raw and treated samples and the high average of 0.09 mg/l, I would believe the tetrachloroethylene contamination is possibly do to the use of coated A/C pipe in the raw water lines at Tarawa Terrace.. Tetrachloroethylene, in the Hadnot Point system samples is at trace levels and well under recommended levels.

9. The level of trichloroethylene, at Hadnot Point, is presently averaging 20 ug/l, which is below all three recommended snarls; 1-day, 10-day, and chronic. No explaination is offered for the 1400 ug/l level on 27 May 1982, or why it is now averaging only 20 ug/l.

Elizabeth A. Betz
Supervisory Chemist

Special Testing of
TT + HP plants for
Trichloroethylene & Tetrachloroethylene
Both within limits. Recommend
sending Data to Plant Div.



11/10/02 12:58 FAX 12088835353 KINKOS MOSCOW 009

09.07-04/30/85-02

UNITED STATES MARINE CORPS
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

IN REPLY REFER TO:
11101
FAC
30 APR 1985

NOTICE TO RESIDENTS OF TARAWA TERRACE

We are having some serious problems supplying enough water for the Tarawa Terrace housing area.

Two of the wells that supply Tarawa Terrace have had to be taken off line because minute (trace) amounts of several organic chemicals have been detected in the water. There are no definitive State or Federal regulations regarding a safe level of these compounds, but as a precaution, I have ordered the closure of these wells for all but emergency situations when fire protection or domestic supply would be threatened.

what b.e. the VOC's found?

With the advent of warmer weather, increased water consumption is depleting the supply in the reservoir faster than the remaining wells can replenish it. Even after opening the lines to the Camp Johnson water system (which has caused the bad taste and odor many of you noticed), the supply cannot meet the demand. This critical situation will be relieved somewhat in early June with the completed construction of an auxiliary water line from Hadnot Point.

Until then, however, daily water consumption must be reduced significantly. You are the only ones who can make this happen. I solicit your cooperation and assistance in implementation of the following water use restrictions:

1. Reduce domestic water use.

   a. Don't let water run while washing, shaving, brushing teeth, etc.

   b. Wash clothes only when you have a full load.

   c. Flush toilet only for sanitation purposes.

   d. Store cold water in refrigerator for drinking.

   e. Take short showers.

   f. Report any drips, leaks or running toilets immediately to Base Maintenance.

2. Car washing is prohibited until further notice.

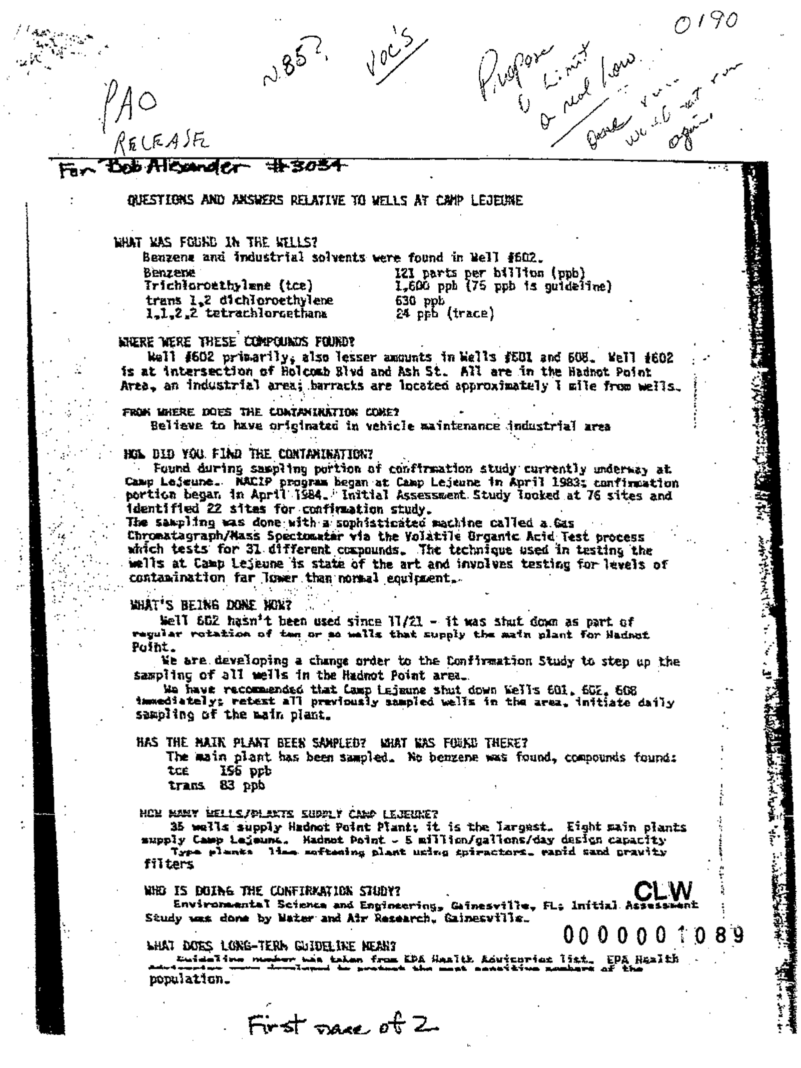
3. Yard watering is permitted only from 0600-0900, Mondays through Thursdays. Do not water excessively or allow water to run into the street.

Suggested No-Adverse-Effect Recommended Levels

Subj: NOTICE TO RESIDENTS OF TARAWA TERRACE

Thank you for your understanding in this matter. If these measures are effective in reducing overall water usage, we should be able to open the Tarawa Terrace swimming pool as scheduled. We will keep you informed.

L. H. BUEHL
Major General, U.S. Marine Corps
Commanding General



0190

PAO
RELEASE

N85?

VOC's

Propose
Limit
a real low.
Done [illegible]
would not run
again

For Bob Alexander #3054

QUESTIONS AND ANSWERS RELATIVE TO WELLS AT CAMP LEJEUNE

WHAT WAS FOUND IN THE WELLS?

Benzene and industrial solvents were found in Well #602.

Benzene	121 parts per billion (ppb)
Trichloroethylene (tce)	1,600 ppb (75 ppb is guideline)
trans 1,2 dichloroethylene	630 ppb
1,1,2,2 tetrachloroethane	24 ppb (trace)

WHERE WERE THESE COMPOUNDS FOUND?

Well #602 primarily, also lesser amounts in Wells #601 and 608. Well #602 is at intersection of Holcomb Blvd and Ash St. All are in the Hadnot Point Area, an industrial area; barracks are located approximately 1 mile from wells.

FROM WHERE DOES THE CONTAMINATION COME?

Believe to have originated in vehicle maintenance industrial area

HOW DID YOU FIND THE CONTAMINATION?

Found during sampling portion of confirmation study currently underway at Camp Lejeune. NACIP program began at Camp Lejeune in April 1983; confirmation portion began in April 1984. Initial Assessment Study looked at 76 sites and identified 22 sites for confirmation study.

The sampling was done with a sophisticated machine called a Gas Chromatagraph/Mass Spectomater via the Volatile Organic Acid Test process which tests for 31 different compounds. The technique used in testing the wells at Camp Lejeune is state of the art and involves testing for levels of contamination far lower than normal equipment.

WHAT'S BEING DONE NOW?

Well 602 hasn't been used since 11/21 - it was shut down as part of regular rotation of ten or so wells that supply the main plant for Hadnot Point.

We are developing a change order to the Confirmation Study to step up the sampling of all wells in the Hadnot Point area.

We have recommended that Camp Lejeune shut down Wells 601, 602, 608 immediately; retest all previously sampled wells in the area, initiate daily sampling of the main plant.

HAS THE MAIN PLANT BEEN SAMPLED? WHAT WAS FOUND THERE?

The main plant has been sampled. No benzene was found, compounds found:

tce	156 ppb
trans	83 ppb

HOW MANY WELLS/PLANTS SUPPLY CAMP LEJEUNE?

35 wells supply Hadnot Point Plant; it is the largest. Eight main plants supply Camp Lejeune. Hadnot Point - 5 million/gallons/day design capacity

Type plants lime softening plant using spiractors, rapid sand gravity filters

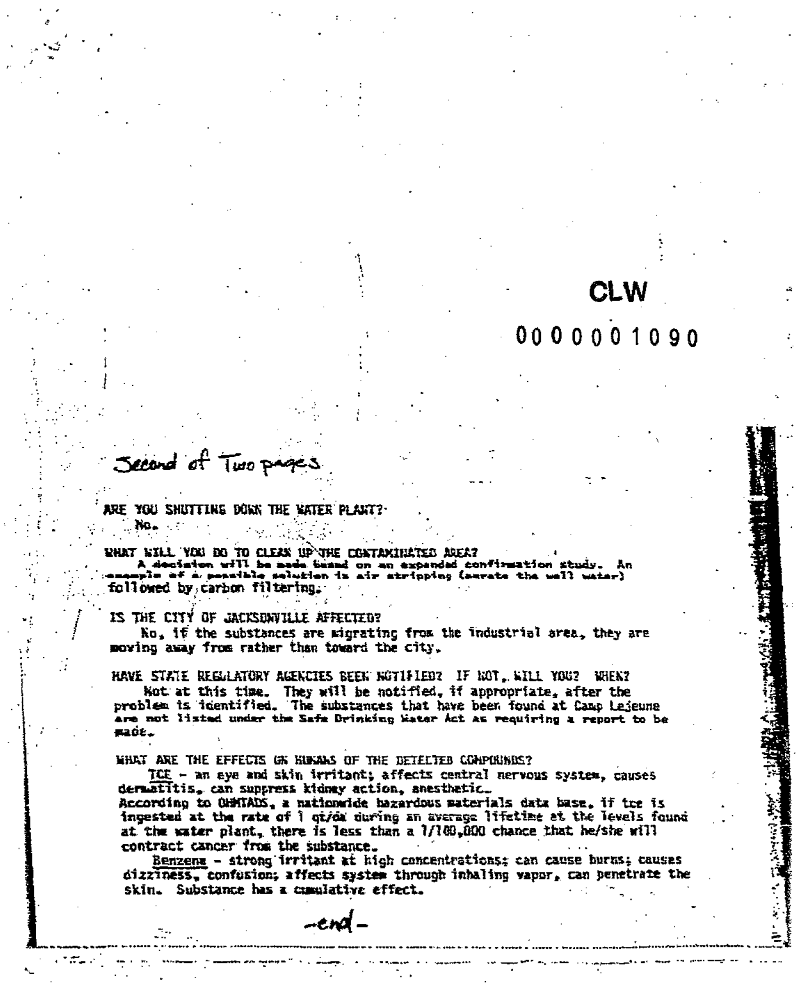
WHO IS DOING THE CONFIRMATION STUDY?

Environmental Science and Engineering, Gainesville, FL; Initial Assessment Study was done by Water and Air Research, Gainesville.

WHAT DOES LONG-TERM GUIDELINE MEAN?

Guideline number was taken from EPA Health Advisories list. EPA Health Advisories were developed to protect the most sensitive members of the population.

First page of 2



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Second of Two pages

ARE YOU SHUTTING DOWN THE WATER PLANT?
No.

WHAT WILL YOU DO TO CLEAN UP THE CONTAMINATED AREA?
A decision will be made based on an expanded confirmation study. An example of a possible solution is air stripping (aerate the well water) followed by carbon filtering.

IS THE CITY OF JACKSONVILLE AFFECTED?
No, if the substances are migrating from the industrial area, they are moving away from rather than toward the city.

HAVE STATE REGULATORY AGENCIES BEEN NOTIFIED? IF NOT, WILL YOU? WHEN?
Not at this time. They will be notified, if appropriate, after the problem is identified. The substances that have been found at Camp Lejeune are not listed under the Safe Drinking Water Act as requiring a report to be made.

WHAT ARE THE EFFECTS ON HUMANS OF THE DETECTED COMPOUNDS?
TCE - an eye and skin irritant; affects central nervous system, causes dermatitis, can suppress kidney action, anesthetic.
According to OHMTADS, a nationwide hazardous materials data base, if tce is ingested at the rate of 1 qt/da during an average lifetime at the levels found at the water plant, there is less than a 1/100,000 chance that he/she will contract cancer from the substance.
Benzene - strong irritant at high concentrations; can cause burns; causes dizziness, confusion; affects system through inhaling vapor, can penetrate the skin. Substance has a cumulative effect.

-end-

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I-Team: The Few, The Proud, The Forgotten Part II

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Reporting
Michele Gillen
E-mail

CAMP LEJUNE, N.C (CBS4) — With a slight tremble, Jody MacPherson held up her ring finger, "I am not wearing a wedding ring. The month before he died we pawned it. That's it. That's all I had left of him."

MacPherson was married to Marine Corporal Ian Colin MacPherson for 22 years. The proud son of a Marine, he was born at Camp Lejune, North Carolina, just steps from where the government now admits a toxic plume of chemicals contaminated base drinking wells. Wells that supplied the very water his mother drank while she was pregnant, water he played in as a child.

"When he would sweat his forehead would get blisters. When he would shower off he said it felt like it was acid in the shower," his widow told Chief I-Team Investigator Michele Gillen as she recalled her beloved husband. She explained he was plagued throughout his life by mysterious rashes, lumps, and tumors. At 39 years old, prostate and other rare cancers had invaded his body and killed him.

"The doctor pointed to the tip of his toe to the top of his head, every single organ in his body, every lymph node, every muscle, every bone, in his blood, everywhere. He said he had never seen anything that aggressive," she said.

When he died, neither the Corporal nor his widow had been informed by the military - what documents show the I-Team has been known for a very long time - that tap water at Camp Lejeune was contaminated during the time he and his family and hundreds of thousands of others, lived there.

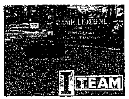
"I'm extremely angry. I feel like they killed him," contended MacPherson. "They knew he was drinking this water. They knew all along that he was drinking this water."

Mrs. MacPherson is not alone in what she calls a search for truth.

"They poisoned me. I want the answer. I want the truth," those words told to Gillen by Mike Partain. He too was born at Camp Lejeune. He says his pregnant mother drank the tainted water. He just discovered he has breast cancer and needs a mastecomy. Partain has since located more than 53 other men who lived or served on the base and are now suffering from breast cancer, and other rare cancers, disease and birth defects.

"When we find these people most of the people never knew. They are like me. The Government and the Marine Corps knew I had been exposed. They did not tell me," says Partain, "I had no idea about this."

But one man did know. His name is Michael Hargett. "The moms there were pregnant and drinking the water, they were drinking contaminated water?" Gillen asked Hargett, meeting in Charlotte, North Carolina.



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I-Team: The Few, The Proud, The Forgotten?
(11/29/2009)

"They were exposed to these industrial solvents. They were exposed to a contaminate, a man made contaminate, that was present in their water. The effects of that were understood at that time."

Micheal Hargett was the co-owner of Granger Lab, which was hired by the Marine Corps in 1982 to test the water on the base. In his first television interview, he talks about the environmental nightmare he and his chemists discovered in the drinking water at Camp LeJeune.

"This was contaminated with dry cleaning solvent a lot of dry cleaning solvent," Hargett explained to Gillen.

"To have a man made chemical present, this was obviously a tremendous red flag to say there is a looming problem that must be addressed," said the man who was so worried about the findings, that he wrote and called the base and went in person.

"I made three trips down to Camp Lejeune to discuss this with the base chemist and other base personal. It was that important. That we wanted to say you have a problem you need to address it. I was frustrated because we went to a meeting with the Lt. Colonel and had less than five minutes on this vital subject. We were blown off," Hargett tells Gillen. She asked about his intention once evidence of contamination was discovered.
"Did you feel that that the tap water wells should have been shut down?" asked Gillen.

"That was a specific recommendation that we provided the base chemist. When we went to the wells. We pointed out the wells with the highest contamination. We suggested they avoid using those wells. Shut those wells down," Hargett insists.

Documents show that didn't happen. The highly contaminated wells stayed open for three more years, until they were shut down in 1985.

"There was no foot dragging by the Marine Corps once we knew," that according to Marine General Eugene Payne, who is now in charge of installations across the country and joined Gillen for an interview via satellite from Washington, D.C.

"The wells were closed within 30 days of finding the source of contamination," he claimed.

But General Payne was talking about an originating source of contamination which included the dry cleaners across from the base. While that reportedly took years to confirm, Hargett doesn't understand why the tap water wasn't immediately shut off once it was confirmed the water was contaminated.

What were families drinking during the time? Hargett says water tainted with a chemical solvent named trichlorethelyne, TCE.

"That was an abomination," according to Hargett.

"I think what we have seen is a lot of deny and delay," North Carolina Senator Richard Burr tells Gillen. Burr said there is a crying need for answers and attention to what really went wrong at Camp Lejeune. Gillen reviewed with him Marine Corps records documenting concerns over red flags raised in the early 1980s.

"It is recommended that the information be "de-emphasized throughout this report." It looks like red flags were raised and then?" Gillen asks.

"Not just ignored but manipulated and I think that is the concern," says Burr.

A recent report written by The National Research Council, which the Marine Corps calls an independent panel of scientists, although they have been contracted to consult for the Marine Corps, claims there is no proven link between the contaminated water of Camp Lejeune and illnesses.

But Hargett says it was known long ago that health risks were linked to the type of contaminants found in the tap water. In fact, Hargett says the Marine base chemist admitted it.

"She actually writes up trichlorethelyne at high levels, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. That was is in 1982 and yet the military position today is that there is not even a potential link," says Gillen.

"Obviously, there is a smoking gun here. Someone knew, someone communicated it with an official memo within the base. But someone chose to ignore it. Or did not understand how significant it was," Hargett tells Gillen who asked about his reaction to reports of the health status of babies born at Camp Lejeune. Men with breast cancer, others fighting neurological disease and rare cancers; what impact did this have on him when he learned of his?

"Oh, I had a pang of guilt, because I knew I had not been as diligent as I needed to be to bring this attention to the right authorities. Or someone had dropped the ball. My heart went out to those people because they had been injured by a problem that we had recognized early," Hargett shared with tears welling up in his eyes. Does the reality of what some families who once lived at the camp make him emotional?"

"Oh, it absolutely does. There are some people who are responsible for either not being diligent or not being appropriately informed to make the right decisions and the right operation changes."

For Jodi MacPherson It's simple. "I feel like they are spitting in our face." MacPherson got a call from the military two years after her husband died inquiring about his birth at Camp Lejeune and his health. A year later she got a letter alerting them there may have been a problem with the water.

"Our inability to communicate to all of these families has been a pitiful example of what the power of the federal government is, "says Senator Burr.

It's the future that Hargett says the nation now needs to be focused on, determined he says that something has to come from this chapter of suffering.

"At least a lesson and certainly some accountability," Hargett insists." Right now I am not sure we have either."

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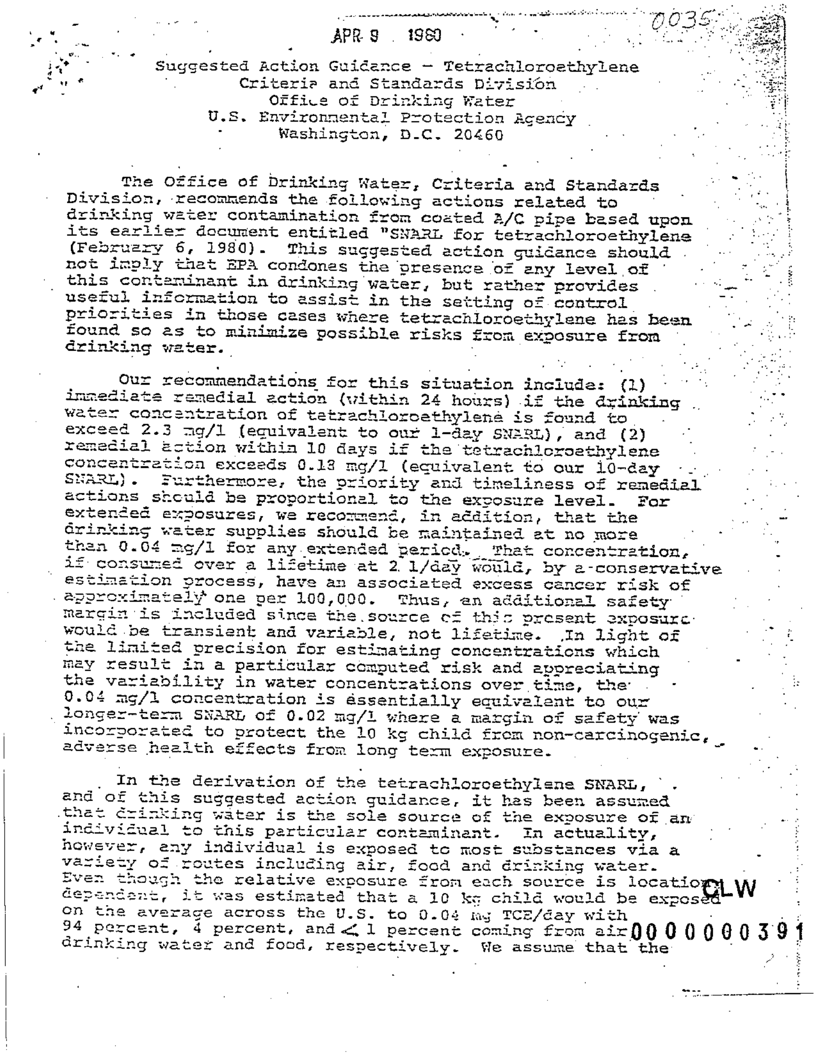
MICHAEL HARGETT

SUPPORTING DOCUMENTS



APR 9 1980

Suggested Action Guidance – Tetrachloroethylene
Criteria and Standards Division
Office of Drinking Water
U.S. Environmental Protection Agency
Washington, D.C. 20460

The Office of Drinking Water, Criteria and Standards Division, recommends the following actions related to drinking water contamination from coated A/C pipe based upon its earlier document entitled "SNARL for tetrachloroethylene (February 6, 1980). This suggested action guidance should not imply that EPA condones the presence of any level of this contaminant in drinking water, but rather provides useful information to assist in the setting of control priorities in those cases where tetrachloroethylene has been found so as to minimize possible risks from exposure from drinking water.

Our recommendations for this situation include: (1) immediate remedial action (within 24 hours) if the drinking water concentration of tetrachloroethylene is found to exceed 2.3 mg/l (equivalent to our 1-day SNARL), and (2) remedial action within 10 days if the tetrachloroethylene concentration exceeds 0.18 mg/l (equivalent to our 10-day SNARL). Furthermore, the priority and timeliness of remedial actions should be proportional to the exposure level. For extended exposures, we recommend, in addition, that the drinking water supplies should be maintained at no more than 0.04 mg/l for any extended period. That concentration, if consumed over a lifetime at 2 l/day would, by a conservative estimation process, have an associated excess cancer risk of approximately* one per 100,000. Thus, an additional safety margin is included since the source of this present exposure would be transient and variable, not lifetime. In light of the limited precision for estimating concentrations which may result in a particular computed risk and appreciating the variability in water concentrations over time, the 0.04 mg/l concentration is essentially equivalent to our longer-term SNARL of 0.02 mg/l where a margin of safety was incorporated to protect the 10 kg child from non-carcinogenic, adverse health effects from long term exposure.

In the derivation of the tetrachloroethylene SNARL, and of this suggested action guidance, it has been assumed that drinking water is the sole source of the exposure of an individual to this particular contaminant. In actuality, however, any individual is exposed to most substances via a variety of routes including air, food and drinking water. Even though the relative exposure from each source is location dependent, it was estimated that a 10 kg child would be exposed on the average across the U.S. to 0.04 mg TCE/day with 94 percent, 4 percent, and $\leq$ 1 percent coming from air, drinking water and food, respectively. We assume that the rate of absorption through the gastrointestinal tract for food and water is nearly 100 percent and that the rate of absorption via inhalation is approximately 30 percent. Further consideration should also be given to the fact that the amount of tetrachloroethylene exposure from air would be much higher for people working in dry-cleaning and metal degreasing industries. With the exception of occupational exposure to tetrachloroethylene, then, the body burden from non-impacted environmental sources and the associated background levels due to normal releases of tetrachloroethylene nationally are roughly equivalent to the longer-term SNARL of 0.02 mg/l or the suggested guidance of 0.04 mg/l (rounded from the 35 ug/l SNARL). The suggested guidance would then pose, a risk which is essentially equivalent to that experienced from exposure to the national background levels.

GRAINGER LABORATORIES, INC.
LETTER OF AUGUST 10, 1982

ALSO ATTACHED ARE

MEMORANDUM FOR THE RECORDS WRITTEN BY SUPERVISORY CHEMIST
DATED MAY 25, 1982 AND JULY 30, 1982

MEMORANDUM WRITTEN BY SUPVY CHEMIST TO SUPVY ECOLOGIST
DATED AUGUST 19, 1982

GRAINGER LABORATORIES
INCORPORATED
ANALYTICAL AND CONSULTING CHEMISTS
709 West Johnson Street • Raleigh, North Carolina 27603
(919) 828-3360

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Identification of Unknowns
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Fuels
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Hazardous Waste

CONSULTATION
Metallurgical Services
Pollution Abatement
Process Development
Quality Control
Methods Development
Special Investigation
Pesticides
RCRA

August 10, 1982
82-4471

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Discussion:

Previously all samples from site TT and HP presented difficulties in performing the monthly Trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejuene personnel.

Results:

The identity of the contaminant in the well field represented by samples 206 and 207 was suspected to be Tetrachloroethylene. This was confirmed by two analytical techniques and the results were 76 µg/l and 82 µg/l for samples 206 and 207 respectively.. Sample 86 from May 27, 1982 was reanalyzed as a part of our study. Sample 86 was from site TT and contained 80 µg/l tetrachloroethylene.

Samples 208 and 209 were also analyzed by the same analytical techniques. The magnitude of the contamination was not as great as previously observed from this same sampling point. Upon reanalyzing sample 120 from site HP May 27, 1982 , Trichloroethylene was identified and quantitated at 1400 µg/l. A lesser amount of Tetrachloroethylene was confirmed at 15 µg/l. Samples 208 and 209 contained 19 µg/l and 21 µg/l Trichloroethylene respectively; Tetrachloroethylene was not detected.

Prior to this report, the samples from July 28, 1982 from site HP were analyzed. Traces of both solvents were found in this set. Though not quantitated, the level of Trichloroethylene seems to be in the range of that which was found in samples 208 and 209. The sample which showed the most contamination relative to the others was 205. Also sample 168 from site TT on July 28, 1982 was analyzed and shown to contain 104 µg/l Tetrachloroethylene.

Conclusion:

Tetrachloroethylene was identified as the contaminant in the well field coded "TT". Its concentration seems relatively stable over the period in which it has been examined. It was confirmed that the well field coded "HP" has shown contamination by Trichloroethylene and Tetrachloroethylene. These levels have been variable over the per studied and are now at significantly lower levels than when first encountered. The following table summarizes the findings:

Sample	Date Taken	Site Code	Tri chloroethylene	Tetra-chloroethylene
206	7-27-82	TT	[illegible]	76
207	7-27-82	TT	[illegible]	82
86	5-27-82	TT	[illegible]	80
168	7-28-82	TT	[illegible]	104
208	7-27-82	HP	19	<1
209	7-27-82	HP	21	<1
120	5-27-82	HP	1400	15
205	7-28-82	HP	No Data	1.0

Bruce A. Babson
Bruce A. Babson
Chemist

BAB/ab
Customer #92400

Date: 25 May 1982

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

Subj: Phone Conversation with Mike Hargett on 6 May 1982

1. On 6 May 1982, Mike Hargett, of Grainger Labs called to say that during the analysis of April's 1982 samples they had some interferences. He said that peaks for Perclene and Trichloroethylene (TCE), which are synthetic organic cleaning solvents were found in samples #001-005 (Tarawa Terrace Water System) and #037-041 (Hadnot Point Water System). He also stated that the TCE peak for the Hadnot Point samples overlapped the Bromodichloromethane peak. He asked if a less than value would be accepteable since that is all that could be read. I stated that that would be fine. He also stated that no mention would be made of the extra peaks except for the less than value on the report.

2. Right after I talked with Mike Hargett, I notified Danny Sharpe, Supervisory Ecologist, of Grainger's findings. The findings were then sent up the chain of command to Billy Elston, Deputy Base Maintenance Officer, and over to the Utilities Director, Fred Cone.

3. Later on 6 May 1982, I called Mike Hargett back to discuss cost of analysis. Analysis would cost $75 for both parameters per sample.

4. On 14 May 1982, while briefing Col Millice and LtCol Fritzgerald on April's trihalomethane analysis, it appeared to me that they had not been informed about the findings. I didn't inform them.

Elizabeth A. Betz
Supervisory Chemist

Date: 30 July 1982

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

Subj: Raw and Treated Sampling at Tarawa Terrace and Hadnot Point Water Treatment Plants

1. On 28 July 1982, Gaines Huneycutt and Elizabeth Betz collected a raw and a treated water sample at the Water Treatment Plants for Hadnot Point and Tarawa Terrace. The reason for the sampling was that during the analysis of the Base's THM samples by Grainger Labs, Grainger had come accross some interferring peaks cause by the presence of trichloroethylene and perclene(synthetic organic cleaning solvents) in the samples from Tarawa Terrace and Hadnot Point.

2. Below is listed the sample numbers and locations of the samples.

Sample #	Location	Time
206 A&B	TT WTP, Bldg STT-38, Raw	1000
207 A&B	TT WTP, Bldg STT-39A, Treated	1005
208 A&B	HP WTP, Bldg 20(Man-hole)Raw	1055
209 A&B	HP WTP, Bldg 20, Treated	1100

3. The sample containers had arrived in an ice chest from Grainger. Mike Hargett had instructed that the samples had to be sent back to Grainger by bus and on ice since the solvents were highly volatile. A DD1348/1 was prepared by Mr. Richardson of Base Maintenance Property Office. At approximately 1130, the samples were carried to Freight Traffic, who had arranged to take them to the bus station for the 1400 bus to Raleigh. Mike Hargett was called and notified to have someone pick up the samples at approximately 1730 at the Raleigh bus station.

4. During a phone conversation with Mike Hargett on 30 July 1982, it was learned that the samples had been received.

Elizabeth A. Betz
Supervisory Chemist

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

1. On 6 May 1982, Mike Hargett, of Grainger Labs, called and informed me that on 3 May 1982, while they were analyzing the first set of Trihalomethane samples received from us, interferences possibly from chlorinated hydrocarbons hindered analysis of samples from two systems, Tarawa Terrace and Hadnot Point.

2. It was determined that raw and treated samples from the treatment plants for the two systems would be taken for analysis of the interferring chlorinated hydrocarbons. On 28 July 1982, a raw water sample, #206, and a treated water sample, #207, were taken at the Tarawa Terrace water treatment plant. A raw water sample, #208, and a treated water sample, #209, were taken at the Hadnot Point water treatment plant, on 28 July 1982. The Trihalomethane samples for July were also taken on 28 July 1982, for these two systems. In Grainger's letter, of 10 August 1982, they erroneous report the samplessas taken on 27 July 1982, they were collected and shipped on 28 July 1982.

3. Analysis of the above samples and some Grainger had preserved showed that in the Tarawa Terrace water treatment plant and system, the interferring chlorinated hydrocarbon is tetrachloroethylene, or otherwise known as perchloroethylene. Tetrachloroethylene is used as a dry cleaning and degreasing solvent, and heat-transfer medium, Analysis of the Hadnot Point water treatment plant and system samples showed Trichloroethylene and low levels of tetrachloroethylene. Trichloroethylene is used primarily as a metal degreaser. It is also used as a dry-cleaning solvent and a type of pesticide, fumigant.

4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

5. Tetrachloroethylene, in high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for tetrachloroethylene are 2300 ug/l for 1-day, 175 ug/l for 10-days, and 20 ug/l for longer-term where drinking water is the only source of exposure. On 9 April 1980, EPA came out with a Suggested Action Guidance on Tetrachloroethylene. This guidance was a result of possible tetrachloroethylene contamination of drinking water

where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/l (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/l (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/l.

6. Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethanes), at high levels , has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for trichloroethylene were determined to be 2 mg/l for 1-day, 0.2 mg/l for 10-day, and 75 ug/l for a chronic snarl. There is no Suggested Action Guidance on trichloroethylene.

7. Below is a table of the results received from Grainger labs.

Sample #	Sample Date	WTP	Sample Site	_chloroethylene, ug/l Tri-	 Tetra-
86 168	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data	100
208	7-28-82	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

8. The level of tetrachloroethylene for the Tarawa Terrace system samples averaged 0.09 mg/l, which exceeded the recommended level of 0.04 mg/l. The levels do not vary significantly between the raw and treated samples. The raw and treated samples were taken at the plant where the water had already traveled some distance in pipes. Therefore, with no significant difference between raw and treated samples and the high average of 0.09 mg/l, I would believe the tetrachloroethylene contamination is possibly do to the use of coated A/C pipe in the raw water lines at Tarawa Terrace.. Tetrachloroethylene, in the Hadnot Point system samples is at trace levels and well under recommended levels.

9. The level of trichloroethylene, at Hadnot Point, is presently averaging 20 ug/l, which is below all three recommended snarls; 1-day, 10-day, and chronic. No explaination is offered for the 1400 ug/l level on 27 May 1982, or why it is now averaging only 20 ug/l.

Elizabeth A. Betz
Supervisory Chemist

JIM WATTERS

SUPPORTING DOCUMENTS

July 19, 2010

5525 79th Street
Lubbock, TX 79424
jim.watters@ttuhsc.edu
(806) 743.3011 (office)

General James T. Conway
Commandant of the Marine Corps
HQBN, MC NC RC
Henderson Hall
1555 S. Southgate Road
Building 29
Arlington, VA., 22214-5000

Re: Poisoning of Water at Camp LeJeune, NC

Dear General Conway:

As you are aware, between the years 1957 and 1987 an estimated 500,000 to 1,000,000 Marines, Naval personnel, Civil Service employees and dependant women and children were accidentally poisoned while stationed, working or living aboard Marine Corps Base Camp Lejeune, NC (MCBCLNC), through ingestion of water containing massive doses of volatile organic compounds (VOCs) such as trichloroethylene (TCE), benzene and tetrachloroethylene.

As you are also aware, the USMC and the Department of the Navy (DON) attempted to cover up this environmental disaster by withholding documents, ignoring warnings of the danger, hiring consultants who minimized or concealed the dangers, waiting for Congress to mandate the notification of victims 21 years after the USMC was aware of the exposure and vigorously opposing any efforts to provide medical care or any compensation to the victims for their illnesses, suffering and deaths. You may disagree with this assessment but the evidence exists, is public record and more such evidence is becoming available as these events are examined in the light of day.

I was stationed at Naval Regional Medical Center MCBCLNC during the years 1977 – 1979 and have been diagnosed with terminal metastatic renal cell carcinoma, which the Department of Veterans Affairs (VA) has determined was caused by my exposure to massive doses of TCE in the water I drank and in which I showered. This determination was based upon the VA criteria of "as likely as not" which, as required by law, gives the benefit of any doubt about the cause of the injury or disability to the veteran.

I am one of only a handful of veterans who have won my appeal of several claim denials from the VA and who now receives healthcare and 100% disability compensation from the VA. Past and continuing USMC, DON, and DOD resistance in providing documents, funding legitimate scientific studies, and intentional tardy notification (21 years) to the affected community have interfered with and impacted our ability to pursue medical care from the VA.

It is not too strong a statement to say that the USMC, the DON and the DOD have lied to, betrayed and abandoned their "wounded", including women and children, at Camp Lejeune and basically left them to suffer and die!

Prior to my service as a Naval Medical Service Corps Officer at Camp Lejeune, I was a U.S. Army Infantryman who served in combat in Vietnam. I was trained to never abandon our wounded and I witnessed soldiers who were wounded and killed in their attempt to recover our wounded. The most junior officer or enlisted person in every service knows that to abandon their wounded is cowardly as well as shameful and destroys the morale of the unit.

It is clear that senior officers of the USMC, the DON and the DOD have apparently forgotten it is unforgivable to abandon their wounded, particularly those they themselves have "wounded".

I urge you, as Commandant of the Marine Corps, to work diligently with senior leadership of the DON, the DOD and the U.S. Congress to apply the "as likely as not" criteria to this situation and do everything possible to assist those who were accidentally poisoned at MCBCLNC by providing the healthcare they need and to compensate them for their illnesses and suffering and to compensate the families of those who have died as a result of their faith and trust in the USMC and their service to their country at Camp Lejeune.

Failure of the USMC, the DON and the DOD to accept responsibility and to assist those who were poisoned at Camp Lejeune while serving their country would clearly demonstrate that those who lead the USMC, the DON and the DOD have no courage, honor or integrity and are not deserving of the trust, loyalty and respect they demand of those they lead. It would also prove to all Americans that the Marine Corps motto, Semper Fidelis, no longer has any meaning whatsoever.

Sincerely,

Commander James L. Watters
MSC, USNR (Ret.)

Mr. Steve Allen June 23, 2009

Decision Review Officer

VA Regional Office

701 Clay Ave.

Waco, TX. 76799

Dear Mr. Allen:

Thank you for the opportunity to meet with you and to present my appeal.

On the long drive back to Lubbock I pondered your question regarding whether I had lived aboard Camp LeJeune or had just worked there.

From everything my reading of the large amount of literature on the association between exposure to TCE, and in my case exposure to massive amounts of TCE that were absorbed through my skin, breathed in vapor form and ingested shows, it is my understanding that I was exposed to a more than a sufficient amount to have as likely as not caused my renal cell carcinoma which has now spread to my lungs.

Also, as I understand the VA guidelines for determining service connection, I believe that the criteria have been met, specifically that:

1. Trichloroethylene and the "toxic cocktail" to which I was exposed is a recognized carcinogen.
2. I was stationed and worked at a location for 2 and ½ years where I drank, bathed in and inhaled water highly contaminated with TCE and a mixture of other carcinogenic chemicals. (the EPA "safe" level of TCE exposure is 5ppb and I was exposed to as high as 1,400 ppb, among the highest levels ever recorded by the ATSDR of the U.S. CDC.)
3. I now have the cancer most likely to result from exposure to TCE.

Because of the above I believe it is at least as likely as not that my terminal metastatic renal cell carcinoma should be determined to be service connected using the approach of deciding reasonable doubt in favor of the veteran.

Please let me know if there are any remaining questions that would prevent a decision in my favor.

Sincerely,

James L. Watters 26.567.125

TO: Decision Review Officer, VA Regional Office, Waco, TX

FROM: James L. Watters, C – 26.567.125, 5525 79th St., Lubbock, TX 79424

SUBJECT: Appeal of Denial of Claim for Service Connected Determination for Terminal Metastatic Renal Cell Carcinoma (Reference: VA 349/214A letter dated April 02, 2009

DATE: April 06, 2009

The attached notebook contains information that shows:

1. That from approximately 1955 – 1985 there was a serious problem at Marine Corps Base Camp LeJeune, NC with drinking water contaminated with Trichloroethylene (TCE), Percoethylene and as many as 15 other chemicals that should not be in drinking water. Trichloroethylene contamination levels were recorded to be as high as 1400 parts per billion (PPB). EPA maximum safe levels of TCE are 5 PPB. (Please see documents contained behind tab #1.)

2. That Trichloroethylene is categorized as a carcinogen. (Please see documents contained behind tab #2.)

3. That I was stationed from 1977 – 1979 at Naval Regional Medical Center which was located on Hospital Point, one of the areas of the base served by the Hadnot Point Water Treatment Facility and one of the treatment facilities from which contaminated water was furnished, with the primary contaminant being TCE. (Please see documents behind tab #3.)

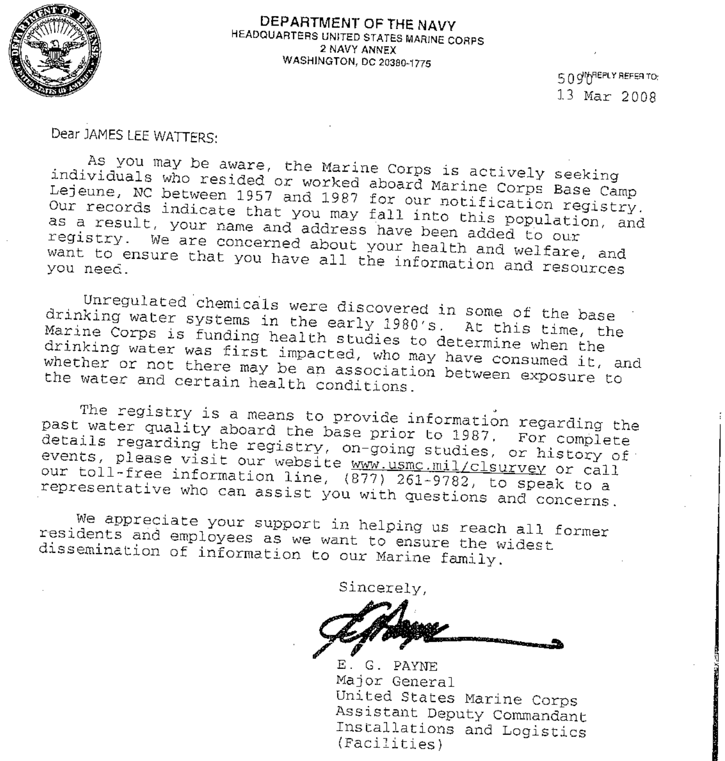
4. That my current diagnosis is terminal metastatic renal cell carcinoma (RCC). (Please see documents behind tab #4)

5. That my treating physicians are of the opinion that my RCC is more than likely a result of my ingestion of and showering in TCE – contaminated water over a 2 ½ year period. (Please see letters contained behind tab #5.)

6. That the Board of Veterans Appeals has decided in favor of the veterans in two instances strikingly similar to mine in that both veterans developed cancer long after their discharge as a result of being stationed at Camp LeJeune and ingesting contaminated water. (Please see BVA decisions behind tab #6.)

I believe these documents clearly demonstrate that my renal cell carcinoma for which I am still being treated, should be determined to be service connected.

Thank you for your consideration of this appeal.



DEPARTMENT OF DEFENSE UNITED STATES OF AMERICA

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
2 NAVY ANNEX
WASHINGTON, DC 20380-1775

IN REPLY REFER TO:
5090
13 Mar 2008

Dear JAMES LEE WATTERS:

As you may be aware, the Marine Corps is actively seeking individuals who resided or worked aboard Marine Corps Base Camp Lejeune, NC between 1957 and 1987 for our notification registry. Our records indicate that you may fall into this population, and as a result, your name and address have been added to our registry. We are concerned about your health and welfare, and want to ensure that you have all the information and resources you need.

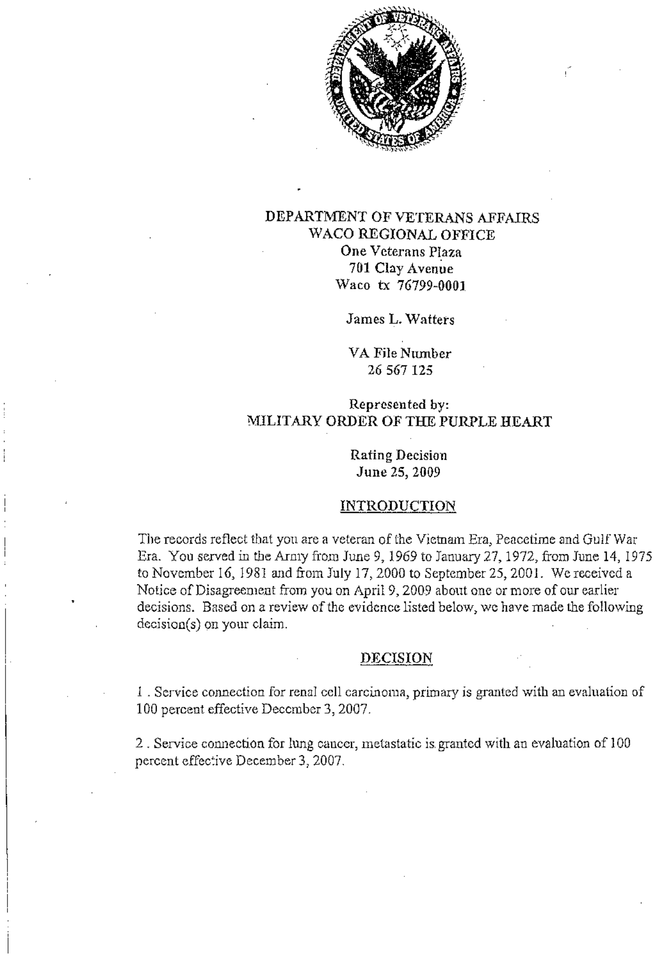
Unregulated chemicals were discovered in some of the base drinking water systems in the early 1980's. At this time, the Marine Corps is funding health studies to determine when the drinking water was first impacted, who may have consumed it, and whether or not there may be an association between exposure to the water and certain health conditions.

The registry is a means to provide information regarding the past water quality aboard the base prior to 1987. For complete details regarding the registry, on-going studies, or history of events, please visit our website www.usmc.mil/clsurvey or call our toll-free information line, (877) 261-9782, to speak to a representative who can assist you with questions and concerns.

We appreciate your support in helping us reach all former residents and employees as we want to ensure the widest dissemination of information to our Marine family.

Sincerely,

E. G. PAYNE
Major General
United States Marine Corps
Assistant Deputy Commandant
Installations and Logistics
(Facilities)



DEPARTMENT OF VETERANS AFFAIRS
WACO REGIONAL OFFICE
One Veterans Plaza
701 Clay Avenue
Waco tx 76799-0001

James L. Watters

VA File Number
26 567 125

Represented by:
MILITARY ORDER OF THE PURPLE HEART

Rating Decision
June 25, 2009

INTRODUCTION

The records reflect that you are a veteran of the Vietnam Era, Peacetime and Gulf War Era. You served in the Army from June 9, 1969 to January 27, 1972, from June 14, 1975 to November 16, 1981 and from July 17, 2000 to September 25, 2001. We received a Notice of Disagreement from you on April 9, 2009 about one or more of our earlier decisions. Based on a review of the evidence listed below, we have made the following decision(s) on your claim.

DECISION

1 . Service connection for renal cell carcinoma, primary is granted with an evaluation of 100 percent effective December 3, 2007.

2 . Service connection for lung cancer, metastatic is granted with an evaluation of 100 percent effective December 3, 2007.

3 . Entitlement to special monthly compensation based on housebound criteria being met is granted from December 3, 2007.

4 . Basic eligibility to Dependents' Educational Assistance is established from December, 3, 2007.

EVIDENCE

- Treatment reports, Amarillo VA Health Care System, from March 20, 2009 through June 10, 2009
- Various Internet articles regarding Camp Lejeune water contamination
- Email, Frank J. Bove, Sc.D, Senior Epidemiologist, Division of Health Studies, Agency for Toxic Substances and Disease Registry, dated June 9, 2009
- Letter, Dr. Cynthia Jumper, Professor and Chair, School of Medicine, Health Science Center, Texas Tech University, dated August 21, 2008
- Letter, Lynn Frame, PhD., School of Medicine, Health Sciences Center, Texas Tech University, dated June 20, 2009
- Letters, Dr. Susan Bergeson, PhD., School of Medicine, Texas Tech University, dated June 17, 2009 and June 23, 2009
- Board of Veterans Appeals Decisions, Docket Numbers 03-18 035; 07-14 584; 01-02 959; 05-26 370
- Treatment reports, Southwest Cancer Center Treatment and Research Center, for the period March 9, 2009 through June 8, 2009
- Letter, Thomas Sinks, PhD., Deputy Director, National Center for Environmental Health/Agency for Toxic Substances and Disease Registry

REASONS FOR DECISION

1. Service connection for renal cell carcinoma, primary.

We have awarded you entitlement to service connection for renal cell carcinoma, primary. An evaluation of 100 percent is assigned from December 3, 2007, the date of receipt of the claim. An evaluation of 100 percent is assigned during active malignancy or antineoplastic therapy. Six months following completion of treatment, residual disability is determined by findings from a VA examination conducted at that time. A complete review of the evidence of record has been accomplished by a Decision Review Officer. Evidence showed you filed a claim that was received December 3, 2007. rating Decision of April 1, 2009, denied service connection for this condition. We received your Notice of Disagreement.

A hearing was conducted, per your request, at which time you submitted additional evidence to support your claim. You reported that the water contamination at Camp Lejeune caused your cancer, which you reported was metastatic to the lungs. Various internet articles confirm that there was water contamination from the Tarawa treatment plant and Hadnot treatment plant during the time you served at this facility. The additional evidence presented shows that your particular type of cancer is known to result from the contaminants TCE, DCE, and PCE. The evidence clearly showed that Hadnot Point treatment facility serviced the hospital on base where you worked. The Board of Veterans Appeals cases you submitted were similar to yours, in that there was documentation of service at Camp Lejeune, and diagnosis of cancer due to the contaminants. These cases were granted service connection. Letters from the multiple medical professionals you submitted all conclude that your cancer of the kidneys was due to water contamination during your service at Camp Lejeune. Treatment reports received with your appeal showed you have Stage IV renal cancer and are undergoing treatment. The preponderance of evidence is for the claim. Therefore, service connection is establishes with an evaluation of 100 percent, effective the date of receipt of the claim. THIS IS A FULL GRANT OF BENEFITS OUGHT ON APPEAL.

2. Service connection for lung cancer, metastatic as secondary to the service-connected disability of renal cell carcinoma, primary.

We have awarded you entitlement to service connection for lung cancer, metastatic as secondary to the service-connected disability of renal cell carcinoma, primary. An evaluation of 100 percent is assigned from December 3, 2007, the date of receipt of the claim. An evaluation of 100 percent is assigned during active malignancy or antineoplastic therapy. Six months following completion of treatment, residual disability is determined by findings from a VA examination conducted at that time.

Evidence received with your appeal shows that the renal cancer you have is related to military service. Treatment reports received with your claim show the renal cancer was metastatic into the lungs. Evidence shows you are currently undergoing treatment. Therefore, service connection on a secondary basis is established effective the date of receipt of the claim.

3. Entitlement to special monthly compensation based on housebound.

We have awarded you entitlement to special monthly compensation. Entitlement to special monthly compensation is warranted in this case because criteria regarding housebound have been met. The evidence of record shows you have been awarded entitlement to service connection for cancer of the kidneys, evaluated as 100 percent disabling, and cancer of the lungs, at 100 percent disabling. Therefore, statutory entitlement to special monthly compensation is shown, effective December 3, 2007, the date entitlement is first shown.

4. Eligibility to Dependents' Educational Assistance under 38 U.S.C. chapter 35.

We have awarded you entitlement to Dependents' Educational Assistance under 38 U.S.C. chapter 35. Eligibility to Dependents' Educational Assistance is derived from a veteran who was discharged under other than dishonorable conditions; and, has a permanent and total service-connected disability; or a permanent and total disability was in existence at the time of death; or the veteran died as a result of a service-connected disability. Also, eligibility exists for a serviceperson who died in service. Finally, eligibility can be derived from a service member who, as a member of the armed forces on active duty, has been listed for more than 90 days as: missing in action; captured in line of duty by a hostile force; or forcibly detained or interned in line of duty by a foreign government or power.

Basic eligibility to Dependents' Education Assistance is granted as the evidence shows the veteran currently has a total service-connected disability, permanent in nature. Evidence shows veteran has been awarded service connection at the 100 percent rate due to multiple disabilities and is shown to be permanently and totally disabled due to these disabilities. Therefore, entitlement is established effective December 3, 2007, the date entitlement is first shown.

REFERENCES:

Title 38 of the Code of Federal Regulations, Pensions, Bonuses and Veterans' Relief contains the regulations of the Department of Veterans Affairs which govern entitlement to all veteran benefits. For additional information regarding applicable laws and regulations, please consult your local library, or visit us at our web site, www.va.gov.

PETER DEVEREAUX

SUPPORTING DOCUMENTS

DEPARTMENT OF VETERANS AFFAIRS
Regional Office
JFK Federal Building
Boston MA. 02203

PETER C. DEVEREAUX

Represented by:
DISABLED AMERICAN VETERANS

Decision Review Officer Decision
August 6, 2010

INTRODUCTION

The records reflect that you are a veteran of the Peacetime. You served in the Marine Corps from September 10, 1980 to December 7, 1984. We received a Notice of Disagreement from you on December 3, 2009 about one or more of our earlier decisions. Based on a review of the evidence listed below, we have made the following decision(s) on your claim.

You requested a review of that decision under the Decision Review Officer process. This review will be a de novo review conducted in accordance with 38 CFR 3.2600. A de novo review is a new and complete review with no deference given to the decision being reviewed.

DECISION

1. Service connection for residuals, breast cancer is granted with an evaluation of 100 percent effective November 11, 2008.

FILE COPY

2. Basic eligibility to Dependents' Educational Assistance is established from November 11, 2008.

EVIDENCE

- A review of your claims folder
- Records received at your personal hearing on May 18, 2010

REASONS FOR DECISION

1. Service connection for residuals, breast cancer.

Service connection for residuals, breast cancer has been established as directly related to military service.

A review of your records show our rating decision of April 20, 2009, denied service connection for this condition. You filed a timely notice of disagreement and requested a Decision Review Officer Review along with a personal hearing. The review shows you served in the U.S. Marine Corps and you served in Camp LeJeune as your records note treatment for back complaints.

At your personal hearing you presented medical evidence of your condition and a number of medical opinions. You also presented a number of studies, which opine that the contaminated water at Camp LeJeune causes breast cancer.

Treatment records from Dana-Farber Cancer Institute note you receive treatment for breast cancer. You received mastectomy, radiation, and chemotherapy for stage III disease, but now you are on antibody and hormonal therapy for stage IV (metastatic) disease. The doctor stated you might have been exposed to ticholoroethylene and perchloroethylene while stationed at Camp LeJeune. The doctor opined that it is as least as likely as not that toxin exposure during your military service contributed to the development of your tumor.

Provided that it is otherwise adequate for rating purposes, a statement from a private physician may be accepted for rating a claim without further examination.

An evaluation of 100 percent is assigned from November 11, 2008, the day we received your claim as you filed a timely notice of disagreement. An evaluation of 100 percent is assigned during active malignancy or antineoplastic therapy. Six months following completion of treatment, residual disability is determined by findings from a VA examination conducted at that time.

A grant of service connection is considered a grant of the benefit sought on appeal. This is an award of all benefits sought on appeal and the appeal is therefore considered satisfied in full.

2. Eligibility to Dependents' Educational Assistance under 38 U.S.C. chapter 35.

Eligibility to Dependents' Educational Assistance is derived from a veteran who was discharged under other than dishonorable conditions; and, has a permanent and total service-connected disability; or a permanent and total disability was in existence at the time of death; or the veteran died as a result of a service-connected disability. Also, eligibility exists for a serviceperson who died in service. Finally, eligibility can be derived from a service member who, as a member of the armed forces on active duty, has been listed for more than 90 days as: missing in action; captured in line of duty by a hostile force; or forcibly detained or interned in line of duty by a foreign government or power.

Basic eligibility to Dependents' Education Assistance is granted as the evidence shows you currently have a total service-connected disability, permanent in nature.

REFERENCES:

Title 38 of the Code of Federal Regulations, Pensions, Bonuses and Veterans' Relief contains the regulations of the Department of Veterans Affairs which govern entitlement to all veteran benefits. For additional information regarding applicable laws and regulations, please consult your local library, or visit us at our web site, www.va.gov.

ATSDR RESPONSE TO U.S. MARINE CORPS BOOKLET, "CAMP LEJEUNE: HISTORIC DRINKING WATER, QUESTIONS AND ANWERS," JULY 2010

ATSDR recommendations related to the U.S. Marine Corps Pamphlet: ***Camp Lejeune Historic Drinking Water Questions and Answers*** (provided to USMC 9/10/2010)

Page 1: "The DON has provided more than $22 million in funding to support scientific research to determine the impact contaminants may have had on former residents of Camp Lejeune."
Recommendation: Include ATSDR's role in the research related to contaminants in the drinking water servicing Camp Lejeune.

Page 1: "To date, the scientific community has not established an association between exposure to the contaminated water and health conditions reported by former residents of Camp Lejeune."
Recommendation: Clarifying this statement would be helpful. The epidemiological studies of health conditions (i.e., the case-control, mortality and health survey/morbidity studies) have not yet been completed. Moreover, associations were found with Small for Gestational Age (SGA) and specific sub-groupings of PCE-exposed mothers. SGA was not a health condition "reported by former residents" but instead was an adverse outcome that has been found in other studies at other sites to be associated with environmental exposures including exposures to chemical drinking water contaminants. Evidence exists, based mostly on occupational studies, of associations between these chemical contaminants and cancers and other adverse health outcomes.

Page 3: "Recent studies have estimated that drinking water systems at CL may have been impacted from 1957, or perhaps earlier, until as late as 1987."
Recommendation: Mention ATSDR's role in conducting this research. (Note: ATSDR is first mentioned in the timeline on page 4.)

Page 10: "The studies conducted to date have not shown any causal link between exposure to contaminated water at Camp Lejeune and illnesses."
Recommendation: Again, the only completed study at Camp Lejeune did find an association between SGA and specific sub-groupings of PCE-exposed mothers. The booklet should report these findings and state that research on other illnesses is still underway.

Page 11: "At this time, scientific studies have not linked exposure.....
Recommendation: Again, the only completed study at Camp Lejeune did find an association between SGA and specific sub-groupings of PCE-exposed mothers. The booklet should report these findings and state that research on other illnesses is still underway.

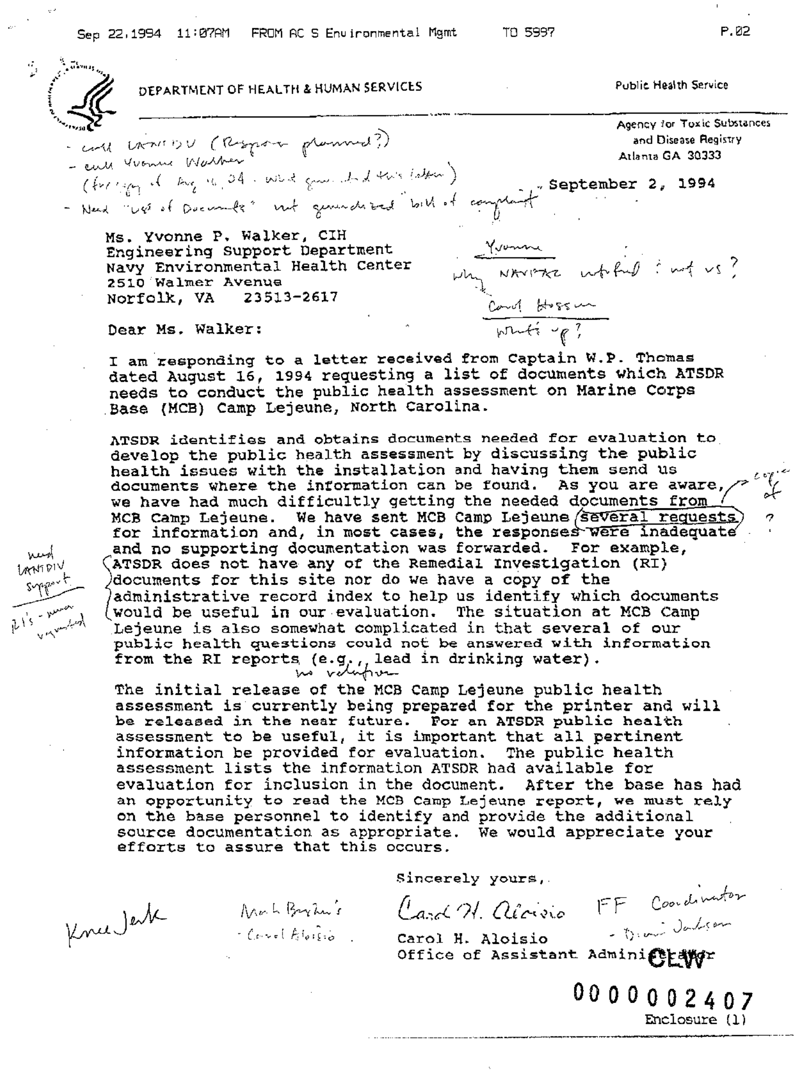
Page 14: "Health Initiative and Independent Reviews Timeline"
Recommendation: Add an entry stating: "June-July 2007: ATSDR releases Executive Summary and Summary of Findings reports for Tarawa Terrace historical reconstruction analyses."

AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY
(ATSDR)

ACCESS TO

DEPARTMENT OF THE NAVY (DON) &
U.S. MARINE CORPS (USMC)

RECORDS RELATED TO CAMP LEJEUNE



Sep 22,1994 11:07AM FROM AC S Environmental Mgmt TO 5997 P.02

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

- call LANTDIV (Response planned?)
- call Yvonne Walker
(for copy of Aug 16, 94 - which generated this letter)
- Need "List of Documents" not generalized "bill of complaint"

September 2, 1994

Ms. Yvonne P. Walker, CIH
Engineering Support Department
Navy Environmental Health Center
2510 Walmer Avenue
Norfolk, VA 23513-2617

Yvonne
why NAVEHC notified & not us?
Carol Hossom
what's up?

Dear Ms. Walker:

I am responding to a letter received from Captain W.P. Thomas dated August 16, 1994 requesting a list of documents which ATSDR needs to conduct the public health assessment on Marine Corps Base (MCB) Camp Lejeune, North Carolina.

ATSDR identifies and obtains documents needed for evaluation to develop the public health assessment by discussing the public health issues with the installation and having them send us documents where the information can be found. As you are aware, we have had much difficultly getting the needed documents from MCB Camp Lejeune. We have sent MCB Camp Lejeune several requests for information and, in most cases, the responses were inadequate and no supporting documentation was forwarded. For example, ATSDR does not have any of the Remedial Investigation (RI) documents for this site nor do we have a copy of the administrative record index to help us identify which documents would be useful in our evaluation. The situation at MCB Camp Lejeune is also somewhat complicated in that several of our public health questions could not be answered with information from the RI reports (e.g., lead in drinking water).

copies of ?

need LANTDIV support

RI's - never requested

no validation

The initial release of the MCB Camp Lejeune public health assessment is currently being prepared for the printer and will be released in the near future. For an ATSDR public health assessment to be useful, it is important that all pertinent information be provided for evaluation. The public health assessment lists the information ATSDR had available for evaluation for inclusion in the document. After the base has had an opportunity to read the MCB Camp Lejeune report, we must rely on the base personnel to identify and provide the additional source documentation as appropriate. We would appreciate your efforts to assure that this occurs.

Sincerely yours,

Carol H. Aloisio

Carol H. Aloisio
Office of Assistant Administrator

FF Coordinator
- Diane Jackson

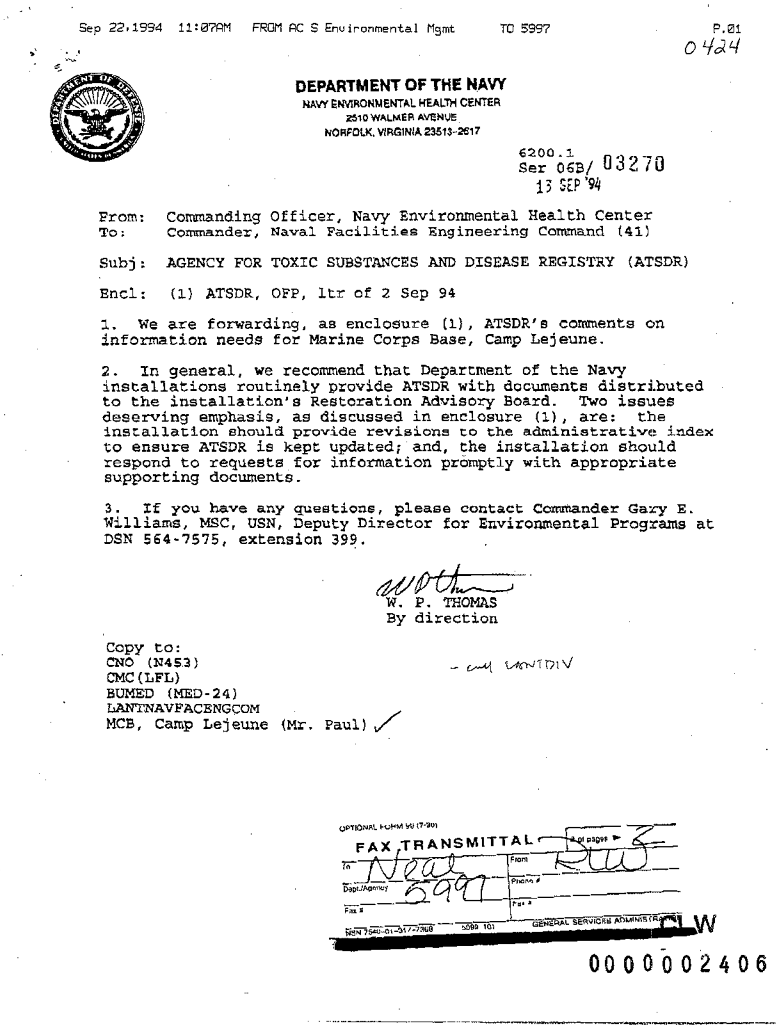
Knee Jerk

Mark Boykin's
- Carol Aloisio

CLW

0000002407

Enclosure (1)



Sep 22,1994 11:07AM FROM AC S Environmental Mgmt TO 5997 P.01

0424

DEPARTMENT OF THE NAVY
NAVY ENVIRONMENTAL HEALTH CENTER
2510 WALMER AVENUE
NORFOLK, VIRGINIA 23513-2617

6200.1
Ser 06B/ 03270
13 SEP '94

From: Commanding Officer, Navy Environmental Health Center
To: Commander, Naval Facilities Engineering Command (41)

Subj: AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR)

Encl: (1) ATSDR, OFP, ltr of 2 Sep 94

1. We are forwarding, as enclosure (1), ATSDR's comments on information needs for Marine Corps Base, Camp Lejeune.

2. In general, we recommend that Department of the Navy installations routinely provide ATSDR with documents distributed to the installation's Restoration Advisory Board. Two issues deserving emphasis, as discussed in enclosure (1), are: the installation should provide revisions to the administrative index to ensure ATSDR is kept updated; and, the installation should respond to requests for information promptly with appropriate supporting documents.

3. If you have any questions, please contact Commander Gary E. Williams, MSC, USN, Deputy Director for Environmental Programs at DSN 564-7575, extension 399.

W. P. THOMAS
By direction

Copy to:
CNO (N453)
CMC(LFL)
BUMED (MED-24)
LANTNAVFACENGCOM
MCB, Camp Lejeune (Mr. Paul) ✓

- cc LANTDIV

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▸ 3

To Neal	From RW
Dept./Agency 5997	Phone #
Fax #	Fax #
NSN 7540-01-317-7368 5099-101	GENERAL SERVICES ADMINISTRATION

CLW

0000002406

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

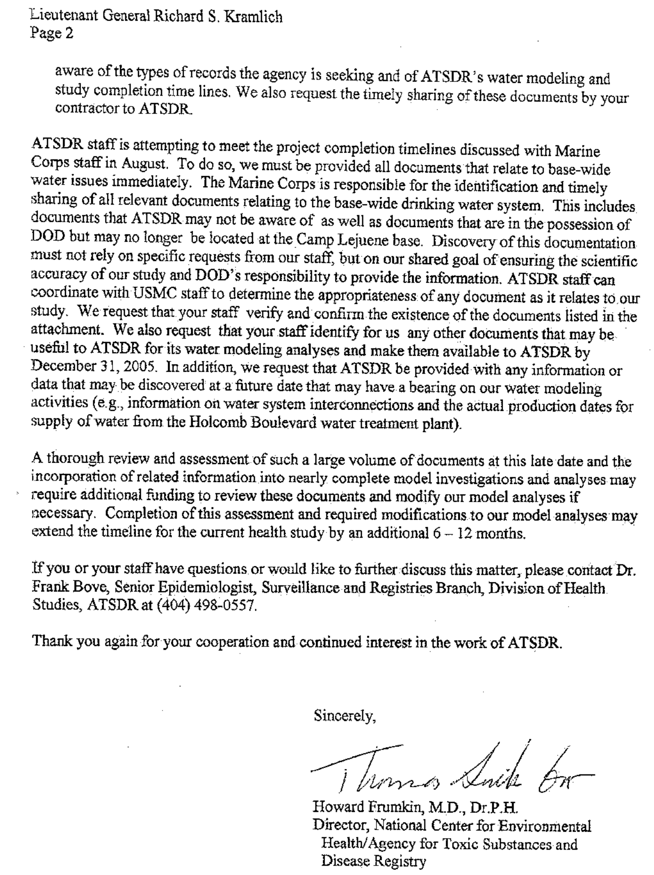
DEC 09 2005

Lieutenant General Richard S. Kramlich
Deputy Commandant of Installations and Logistics
Department of the Navy
Headquarters, United States Marine Corps (Code LFL)
2 Navy Annex
Washington, D.C. 20380-1775

Dear Lt. General Kramlich:

The Agency for Toxic Substances and Disease Registry (ATSDR) is conducting an epidemiologic case-control study of the children whose mothers were pregnant while living on base at Camp Lejeune from 1968-1985. ATSDR staff briefed Lt. General Kelly and other headquarters Marine staff on the status of the current study, including the water modeling component, in August 2005. The purpose of this letter is to seek your assistance in resolving outstanding issues that may delay ATSDR's ability to complete the current health study on time. The issues are as follows:

- ATSDR has experienced delays in obtaining requested information and data pertaining to historical water-quality sampling data and site remedial investigation reports. Attached for your information is a detailed list of these data, previously provided (during February – August 2005) to U.S. Marine Corps (USMC) Headquarters and Camp Lejeune staff, which outlines the needs of ATSDR to complete its water modeling activities;
- ATSDR staff has recently been made aware of the existence of a substantial number of additional documents, previously unknown and not provided to ATSDR staff. These documents are designated as "CLW" documents by the Camp Lejeune Environmental Management Division [EMD] and include summary data files and "document searching software" that could relate to and potentially impact our water modeling activities and analyses;
- The existence of a compilation of historical maps of water system changes at Camp Lejeune from 1941–2000. ATSDR needs to obtain these maps and all supporting spatial and temporal data files to assess the accuracy of ATSDR's understanding of historical changes in water-system configurations at Camp Lejeune; and
- ATSDR's need to have cooperation from and coordination with the USMC contractor currently engaged in a base-wide records discovery program. The contractor should be made



aware of the types of records the agency is seeking and of ATSDR's water modeling and study completion time lines. We also request the timely sharing of these documents by your contractor to ATSDR.

ATSDR staff is attempting to meet the project completion timelines discussed with Marine Corps staff in August. To do so, we must be provided all documents that relate to base-wide water issues immediately. The Marine Corps is responsible for the identification and timely sharing of all relevant documents relating to the base-wide drinking water system. This includes documents that ATSDR may not be aware of as well as documents that are in the possession of DOD but may no longer be located at the Camp Lejuene base. Discovery of this documentation must not rely on specific requests from our staff, but on our shared goal of ensuring the scientific accuracy of our study and DOD's responsibility to provide the information. ATSDR staff can coordinate with USMC staff to determine the appropriateness of any document as it relates to our study. We request that your staff verify and confirm the existence of the documents listed in the attachment. We also request that your staff identify for us any other documents that may be useful to ATSDR for its water modeling analyses and make them available to ATSDR by December 31, 2005. In addition, we request that ATSDR be provided with any information or data that may be discovered at a future date that may have a bearing on our water modeling activities (e.g., information on water system interconnections and the actual production dates for supply of water from the Holcomb Boulevard water treatment plant).

A thorough review and assessment of such a large volume of documents at this late date and the incorporation of related information into nearly complete model investigations and analyses may require additional funding to review these documents and modify our model analyses if necessary. Completion of this assessment and required modifications to our model analyses may extend the timeline for the current health study by an additional 6 – 12 months.

If you or your staff have questions or would like to further discuss this matter, please contact Dr. Frank Bove, Senior Epidemiologist, Surveillance and Registries Branch, Division of Health Studies, ATSDR at (404) 498-0557.

Thank you again for your cooperation and continued interest in the work of ATSDR.

Sincerely,

Thomas Sinks for

Howard Frumkin, M.D., Dr.P.H.
Director, National Center for Environmental
Health/Agency for Toxic Substances and
Disease Registry

Attachment:
ATSDR information and data needs

cc:
Director, DHAC/ATSDR
Director, DHS/ATSDR
Washington Office, ATSDR
OGC/CDC
Mike White, DOD
Frank Bove, DHS/ATSDR
Morris Maslia, DHAC/ATSDR

Information and Data Needed by ATSDR to Complete Water Modeling Activities in Support of the Current Epidemiologic Case-Control Study

1. Camp Lejeune Water Documents: All documents designated as "CLW" by Camp Lejeune and any software developed by or for Camp Lejeune EMD to assist with searching or locating "CLW" documents by key words, topics, dates, etc.

2. Camp Lejeune EMD Summary Files: All files developed by or for Camp Lejeune EMD whose purpose is to aggregate and summarize data that may relate to ATSDR water modeling analyses. These may be such files as MS Excel or MS ACCESS files describing water-supply well information, water-quality sample data, etc.

3. Historical Water System Maps: All maps, map files, spatial data layers, and associated attribute information relating historical changes in Camp Lejeune water systems for years 1941–2000.

4. JTC Environmental Consultants, Inc., Reports: Laboratory reports from sampling conducted by Camp Lejeune and analyses performed by contract laboratory, JTC Environmental Consultants. These reports were submitted to U.S. Environmental Protection Agency, Region IV, by letter dated 25 April 1986. (Request for these data have been made previously on several occasion to Camp Lejeune and headquarters EMD staff)

JTC Report No.	Date of Report
67	5/2/1985
99	7/19/1985
130	9/12/1985
131	9/18/1985
153	10/3/1985
157	10/11/1985
161	10/17/1985
166	10/25/1985
175	11/7/1985
181	11/14/1985
183	11/27/1985
187	11/27/1985
192	12/9/1985
199	12/18/1985
201	12/31/1985
208	1/2/1986
209	1/2/1986
214	1/21/1986
218	1/27/1986
221	1/30/1986
226	2/20/1986

JTC Environmental Consultants, Inc., Reports–continued

JTC Report No.	Date of Report
229	2/25/1986
231	2/26/1986
237	2/28/1986
243	3/12/1986
253	3/27/1986
261	3/27/1986
265	4/14/1986

5. Site Information and Data: Miscellaneous information and data related to historical remedial investigation/feasibility studies (RI/FS) conducted at various sites (operational units) located at Camp Lejeune. (Request for these data have been made previously on several occasion to Camp Lejeune and headquarters EMD staff)

Operational Unit Number	Site Number Recent	1983	Site Name
1	21	21	Transformer storage lot #140
1	24	24	Industrial area fly ash dump
1	78	--	Hadnot Point industrial area
2	6	6	Storage lots 201 and 203
2	9	9	Fire fighting training pit
2	82	--	VOC disposal area at Piney Green Rd.
5	2	2	Former nursery/day-care center
7	1	1	French Creek liquid disposal area
7	28	28	Hadnot Point burn dump
8	16	16	Montford Point burn dump
11	7	7	Tarawa Terrace dump
11	80	--	Paradise Point-golf maintenance area
12	3	3	Old creosote site
15	88	--	Bldg. #25
Pre-RI site	84	--	Bldg. 45 area
Pre-RI site	85	--	Camp Johnson battery dump
Pre-RI site	4	--	Sawmill Road dump
Pre-RI site	5	--	Piney Green Road

Site Information and Data--continued

Operational Unit Number	Site Number Recent	 1983	Site Name
Pre-RI site	8	--	Flammable storage warehouse-TP#451
Pre-RI site	8	--	Flammable storage warehouse-TP#452
Pre-RI site	10	--	Original base dump
Pre-RI site	11	--	Pest control shop
Pre-RI site	12	--	Golf course construction dump site
Pre-RI site	15	--	Montford Point dump
Pre-RI site	18	--	Watkins Village site
Pre-RI site	19	--	Naval Research lab dump
Pre-RI site	20	--	Naval Research lab incinerator
Pre-RI site	22	--	Industrial area tank farm
Pre-RI site	23	--	Roads and grounds, Bldg. 1105
Pre-RI site	25	--	Base incinerator
Pre-RI site	26	--	Coal storage area
Pre-RI site	27	--	Naval Hospital area
Pre-RI site	29	--	Base sanitary landfill
Pre-RI site	32	--	French Creek

6. Contract Information: Information and data related to various contracts. (Request for these data have been made previously on several occasion to Camp Lejeune and headquarters EMD staff)

Contract Number	Remarks
N62470-87-C-9266	Well at holding pond Sprinkler system for golf course
N62470-93-C-5318	Well numbers 1, 3, 4, 5, 6, and 8 S. H. Barner, Inc.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta, GA 30333

March 22, 2010

Mr. Richard G. Mach, Jr. P.E.
Environmental Director
Environmental Compliance and Restoration Policy
Office of the Deputy Assistant Secretary of the Navy
1000 Navy Pentagon, Room 4A674
Washington, D.C. 20350-1000

Major General Eugene G. Payne Jr.
Assistant Deputy Commandant
Installations and Logistics
Headquarters, U.S. Marine Corps (Code LFL)
2 Navy Annex
Washington, D.C. 20380-1775

Dear Mr. Mach and Major General Payne:

I am writing to provide an update on the Agency for Toxic Substances and Disease Registry (ATSDR) efforts to complete the data discovery phase necessary for the water modeling of the Hadnot Point and Holcomb Boulevard areas and to request your commitment that Department of Navy (DON) and the United States Marine Corps (USMC) staff and contractors will provide expedited and full cooperation so this task can be completed by the end of May, 2010. I also am seeking your assurance that DON/ USMC and your contractors have provided ATSDR all relevant environmental information in the custody or control of the DON/USMC and that you or your contractors believe may be relevant to ATSDR's water modeling at Camp Lejeune.

ATSDR has conducted data discovery activities related to our water model of Camp Lejeune since July 2003. Our staffs have been in constant contact regarding information and data requirements. We have located, obtained, reviewed, and assessed numerous and disparate information and data sources (see attachment). Still, at this late date we continue to discover significant additional sources of needed information. The thorough review and assessment of these additional data sources may prolong water-modeling activities.

- In March, 2009 ATSDR first became aware of the NAVFAC-CATLIN underground storage tanks (UST) web portal. An inventory of the portal was recently provided to us showing that it contains 1,535 separate files. One document, identified in January 2010, included the 1996 models developed by a DON contractor of fuel losses at the Hadnot Point fuel farm.[1] That model predicted a loss of between 400,000 to 1.1 million gallons of fuel.

- On March 2, 2010, we were informed for the first time of an electronic database containing approximately 700,000 records of analytical data covering the period 1984-2010 (the CATLIN Access database in the attachment). Please provide an inventory and instructions for using this database along with a readily available point-of-contact so that we can efficiently assess these data.
- On March 3, 2010, ATSDR was notified by members of the Camp Lejeune Community Assistance Panel of the existence of a second NAVFAC web portal that we had not known about.[2] This site includes CERCLA administrative record documents. We believe that 424 documents within this portal have CERCLA numbers that do not correspond to the numbers on CERCLA documents provided to ATSDR in 2006. Identical documents appear in both information sources but appear to have different CERCLA document identification numbers. Please inventory the documents from these two sources and reconcile any differences. Please determine which document are duplicates and which had not been previously provided to ATSDR in 2006. Please provide this reconciliation by April 15, 2010.

As we approach the final stages for data discovery, your efforts to identify missing information by April 15, 2010 is required. Your assurance that all efforts have been made to locate and provide this information is essential to our work. Our current Memorandum of Understanding requires DON to *... assist in data collection...* and provide ... *an inventory of ....environmentally-related data, both classified and unclassified....* Please verify with our technical staff that a complete inventory has been provided and that we have received all relevant information.

The current status of our data discovery review and extraction process is provided as an attachment. ATSDR is working to conclude data discovery by the end of May 2010. All information sources, databases, web portals, and documents need to be reviewed and assessed so that pertinent data can be extracted. Our electronic databases must be constructed before a scope of work can be finalized and water-modeling analyses proceed.

If you or your staff have questions or would like to further discuss this matter, please contact me at (770) 488-0604.

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[1] UST file 01185.pdf; p.526-562.,

[2] https://portal.navfac.navy.mil/portal/page/portal/navfac/navfac_ww_pp/navfac_hq_pp/navfac_env_pp/env_restoration_installations/arf?I=CAMP_LEJEUNE_MCB

Page 3 – Mr. Mach and Major General Payne

Thank you again for your cooperation and continued interest in the work of ATSDR.

Sincerely,

Thomas Sinks

Thomas Sinks
Deputy Director
National Center for Environmental Health/
Agency for Toxic Substances and Disease
Registry

Attachment:
ATSDR information sources

Attachment. Information sources used to extract model-specific data for historical reconstruction analyses.

Information source	Identifier	Location of information source	Quantity or size	Description	Review and extraction status
Information recently received and pending review					
CAP discovery on 03 March 2010 of existence of NAVFAC web portal	NAVFAC CERCLA files	NAVFAC web portal https://portal.navfac.navy.mil/portal/page/portal/navfac/navfac_ww_pp/navfac_hq_pp/navfac_env_pp/env_restoration_installations/arf?I=CAMP_LEJEUNE_MCB	4,761 files listed on web portal	424 documents have CERCLA numbers that do not correspond to numbers on CERCLA documents provided to ATSDR in 2006; identical documents appear in both information sources but appear to have different CERCLA document identification numbers.	DON/USMC to inventory and reconcile documents
CATLIN installation restoration (IR) and underground storage tank (UST) site Access database	CATLIN Access database	CATLIN Engineers and Scientists	About 700,000 records of analytical data	Time frame of data are1984 to January 2010. Database developed from database provided to CATLIN by Camp Lejeune during November 2005; contained analytical data for both UST and installation restoration program (IRP) sites.	Notified by CATLIN on 02 March 2010 of existence of database
Information being reviewed					
Underground storage tank (UST) files	NAVFAC-CATLIN UST	CATLIN Engineers and Scientists web portal; http://lejeune.webmainframe.com/	1,535 files	Information, site data, meeting minutes, monitoring data, etc., related to all UST sites and activities at Camp Lejeune; files vary in size from a few pages to exceeding 1,000 pages for each file	Selective review[1] in progress; (index of files received 01 March 2010)
Information reviewed and assessed, data extracted					
AutoCAD maps	AutoCAD	Camp Lejeune Public Works Division, Technical Records Section, building 1005	About 100 megabytes; 70 files	Quadrangle maps of Camp Lejeune containing features such as topography, utility lines, waste water and water-distribution systems, housing locations, etc.	Complete, selective review
Booz-Allan-Hamilton (BAH) index	BAH	Camp Lejeune building 1037	514 pages (index only); about 8,000–10,000 documents	The BAH index is a list of documents compiled from a base-wide search of buildings and documents; a single index entry may reference several boxes to tens of boxes of documents and information records	Complete, selective review

Attachment. Information sources used to extract model-specific data for historical reconstruction analyses—continued

Information source	Identifier	Location of information source	Quantity or size	Description	Review and extraction status
Information reviewed, assessed, and extracted—continued					
Camp Lejeune water document	CLW CLW 0001.pdf–CLW 8562.pdf	Camp Lejeune Environmental Management Division	About 574 megabytes of storage; about 1,100 files	Documents, handwritten notes, reports, lab analyses primarily related to water supply, distribution, and water quality issues; files vary in size from a few pages to several hundred pages	Complete, selective review
CERCLA administrative record 2006	CERCLA 00001.pdf–03744.pdf	Baker Engineers, Inc. web portal; http://www.bakerenv.com/camplejeune_irp	About 15 gigabytes of storage; about 3,700 files	Documents, handwritten notes, and reports primarily related to installation restoration program sites at Camp Lejeune; files vary in size from a few pages to several hundred pages	Complete, selective review
EQB library	Library	Camp Lejeune, Environmental Quality Branch Library; building 12	Hundreds to thousands of reports and documents	Reports describing all aspects of environmental activities at Camp Lejeune dealing with air and emissions, surface water, ground water, and remediation activities	Complete, selective review
JTC lab reports	JTC	CERCLA and CLW documents	About 21 megabytes of storage; 34 files	JTC laboratory reports of analyses of groundwater constituents, 1984–1988; reports contained within the CERCLA and CLW files; files range from a few pages to tens of pages	Complete, selective review
Public Works Division files	The Vault	Camp Lejeune Public Works Division, Technical Records Section, building 1005	Unknown[2]	Thousands to tens of thousands of files, reports, records, contracts, etc., dealing with anything from utility construction and repair to waste water and water-distribution systems, to historical maps	Complete, selective review
State of North Carolina Records	NCDENR	NCDENR and Historical Archives, Raleigh; NCDENR Regional Office, Wilmington	Unknown[2]	Historical and present-day water-supply information and water-supply well construction information[4]	Complete, selective review, missing records[3]
U.S. Geological Survey files	USGS	USGS, North Carolina Water Science Center, Raleigh	Several hundred pages	Files on well construction, well locations, and water use at Camp Lejeune	Complete, every page reviewed

Attachment. Information sources used to extract model-specific data for historical reconstruction analyses—continued.

Information source	Identifier	Location of information source	Quantity or size	Description	Review and extraction status
Information reviewed, assessed, and extracted—continued					
Water plant log books	Water plant log book	CLW documents CLW 6610.pdf – CLW 8761.pdf	About 2,100 pages	Handwritten entries into water utility log books containing information on personnel issues, mechanical repairs, water-supply operations, water-quality issues, and customer contacts and complaints	Complete, every page reviewed[4]
Water utility files	Well cycling data	Camp Lejeune advanced wastewater treatment plant, building 440	10,000 pages	Ten years of daily records, 1999–2008, indicating water-supply well cycling operations; all handwritten	Complete, every page reviewed
Web sites	The Stand; TFTPTF	http://www.watersurvivors.com http://www.tftptf.com/	Unknown[2]	Former marines and citizens web sites containing miscellaneous information and numerous Camp Lejeune documents (current and historical). Historical obtained from the U.S. Marine Corps through Freedom of Information Act (FOIA) requests	Complete, all historical documents reviewed
Information not reviewed					
Department of Navy contract files	Not applicable	Camp Lejeune Public Works Division, Technical Records Section; the "Vault"; building 1005	Thousands to tens of thousands	Department of Navy and U.S. Marine Corps contract documents	Not reviewed

[1] Selective review: the process of subjecting an information source to a series of reviews; some documents receive a cursory review because it is determined that documents do not yield pertinent data for model-input database development; other documents receive a detailed page-by-page review because it is determined that these documents contain pertinent data for model-input database development.

[2] Unknown: the total number of documents at this location is unknown; however, a subset of documents relevant to water-modeling data needs were reviewed.

[3] In searching the historical archives in Raleigh, North Carolina, information contained in files folders dated 1969–1989 were missing.

[4] Handwritten water plant log book entries pertinent to water-distribution system operations were transcribed verbatim by Exposure-Dose Reconstruction Project staff and contractors; there are about 145 pages of verbatim transcriptions.

File: HPFF

01185

MEMORANDUM **CH2MHILL**

Comments on the Workplan for Additional Plume Delineation, Pumping Well Installation and Pumping Test, Hadnot Point Fuel Farm, Camp Lejeune, N. C.

TO:	Scott Bailey/VBO
FROM:	Sam Shannon /MGM Senior Hydrogeologist
DATE:	February 25, 2003

Introduction

I have completed my review of the work plan referenced above, dated January 2003, which was prepared by Catlin Engineers and Scientists (Catlin) for the Naval Facilities Engineering Command, Atlantic Division (LANTDIV). The site of the proposed work is the Hadnot Point Fuel Farm (HPFF) on Camp Lejeune, NC, which has been the site of significant petroleum contamination.

This independent, third party review of the Catlin Work Plan was initiated to ensure to the extent possible that the work to be performed and the resulting data to be collected would be adequate to meet the remedial goals of the HPFF. Further, by responding to a professional peer review and possibly modifying the work plan accordingly, any work and data which resulted from this effort would be more readily understandable to future workers at the site since a documentation of the logic used to prepare the work plan would be available. This in turn was felt to be needed to maximize the knowledge gained in the time leading up to the test by multiple parties involved in the investigation and remediation of the HPFF.

The work is described by Catlin as being intended to further define the down gradient delineation of the extent of contamination and to .."address the potential of utilizing pump and treat technology to assist in contaminant plume containment and reduction...". Toward those ends; Catlin proposes to install two new down gradient monitoring wells, and one pumping well. A pump test is proposed to be conducted in the new pumping well to provide data to address contamination which, per page 2 of the document, appears to have been caused to migrate deep into the subsurface by production wells which were historically operated in the area.

No further explanation of the conceptual model which accounts for, or attempts to explain the presence of petroleum hydrocarbon contaminants well below the water table at the site is offered. Before the proposed work plan could be evaluated to assess whether it is technically valid at this site, I discussed the site data and history with Ms. Lori Reuther, a hydrogeologist at LANTDIV, who has worked at and with the HPFF data for several years. To provide a basis for my review comments on the referenced document, I will first attempt to present the conceptual model for the HPFF site.

GROUNDWATER AND SUBSURFACE PETROLEUM PRODUCT EVALUATION AT THE FORMER HADNOT POINT FUEL FARM AND BUILDING 1115 AREAS MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

A Preliminary Draft Report

INTRODUCTION

Data on groundwater elevations, petroleum product thicknesses, and BTEX concentrations have been collected at the former Hadnot Point Fuel Farm (HPFF) since 1987. In a separate but parallel project, similar data have been collected from the Building 1115 site since 1993. In this effort Baker has combined the data from these two study areas to present an analysis of the petroleum product from both sources and suggest an approach to delineating the horizontal and vertical extent of the floating product as well as the dissolved benzene plumes.

Both sites are shown on Figure 1: Hadnot Point Fuel Farm being at the east corner of Gibb Road and Ash Street and Building 1115 being at the west corner of Center Road and Ash Street.

MODEL SELECTION

SpillCAD (ES&T, 1994) is a relational database and an analytical model with a graphical interface that is capable of displaying contoured data sets of water levels, product thicknesses and dissolved concentrations. SpillCAD can also estimate the volume of petroleum product in the subsurface based on measured oil thicknesses (using the soil and fluid properties to convert the apparent oil thickness to actual thickness) and/or based on TPH concentrations in the soil. SpillCAD was used to display past and present data and to estimate the volume of product released from the Building 1115 site and the former HPFF (during more than 50 years of operation).

SpillCAD has the ability to generate flowlines (pathlines) based on the contoured groundwater elevation data. This is useful in determining flow directions in a non-uniform flow field like that at the former HPFF and Building 1115 sites. SpillCAD also has the ability to model the dissolved plume of one contaminant in a uniform flow field. However, since the flow field at the two sites in question is not uniform, this application was of little value to this effort.

MODEL INPUTS

Because SpillCAD is an analytical, two-dimensional model, only one value of aquifer permeability was needed as input. This value was taken from the raw data of the pumping tests performed on pumping wells RW-1 and RW-2. Because of an erroneous assumption by O'Brien & Gere (O&G) in the pumping test data analysis, the raw data for both tests were re-evaluated by Baker and found to yield values of 1 foot/day (see Appendix A). This value was used as input to SpillCAD for this analysis. Because the values of permeability were nearly identical in two places across the former HPFF site (RW-1 and RW-2), the aquifer homogeneity can be reasonably assumed for the areas of interest.

SpillCAD also uses inputs of fluid and soil properties. An earlier fingerprint analysis of the product phase indicated that gasoline was the major constituent (O&G, 1990). The properties of a typical gasoline were used as input for the model (as supplied by SpillCAD's internal database). The soil properties were input from results of on-site pumping tests (as discussed above) and from the grain size analyses done by Richard Catlin and Associates (RCA, 1996).

As part of its input, SpillCAD uses the depths to water and oil to determine the true hydrostatic elevation of the water table and actual floating product thickness. These values were input into the model's database. SpillCAD converted the apparent values to actual values based on the properties of the soil and petroleum product (non-aqueous) phase fluid.

MODEL RESULTS

The data were split into two subsets based on the status of the former HPFF pump and treat system: pre-pumping (1988 to mid-1991) and post-pumping (1992 to present). The pre-pumping data exist only at the former HPFF site, no data exist prior to 1993 for the Building 1115 site. Post-pumping data exist at both sites. In the following analyses, the maximum product thicknesses and the average water table elevations (as measured under non-pumping conditions) were used to calculate the volume of released product. Soil TPH data exist but they represent a "snapshot in time" when the borings were performed, hence they were not used in this preliminary analysis. They may be useful in a more detailed evaluation.

Groundwater Flow Direction

1988-1991 Data

Figure 2 shows the average water table elevation from 1988-91 before pumping started. North is at the top of the page and the scale is about 1" = 200' (as on all subsequent figures). Southwest of Ash Street, the horizontal groundwater flow direction is generally west-southwest with the elevation of the water table decreasing from about 21 feet msl near the fuel farm to about 15 feet msl near Holcomb Boulevard. There also appears to have been a localized "high" point near Building 1115. Northeast of Ash Street, the elevation of the water table varies from 18 to 21 feet msl. An apparent groundwater sink exists beneath the former HPFF which cannot be readily explained. It is possible that recharge from precipitation beneath the product phase (and the associated smear zone) has been reduced such that this feature was induced. It is also possible that a localized structural feature is responsible for inducing a downward gradient by preferentially allowing groundwater to flow vertically.

The effect of this feature is that the horizontal flow direction reverses locally and serves to "contain" the horizontal extent of the product phase. The horizontal containment is not complete however, because there are two low points near wells MW-3 and MW-11 which may allow some product to escape laterally.

No data regarding vertical gradients existed before 1995 at either of the sites. However, the sink implies the existence of a downward vertical gradient in groundwater flow.

1995-1996 Data

Figure 3 shows the average water table elevations (measured under non-pumping conditions) from 1995 and 1996. The aforementioned water table sink still is evident beneath the former HPFF and, generally, the horizontal groundwater flow directions are the same. The additional detail made possible by the new data from the Building 1115 site clearly shows the presence of a localized groundwater divide directly beneath Building 1115. North of Building 1115 groundwater flows north and south of the building it flows south.

The vertical gradient in the vicinity of the former HPFF has been documented to be downward at a value of 0.040 (between wells HPFF-5 and HPFF-9) indicating that the area of the former HPFF is a significant recharge area (RCA, 1996). In Figures 4 and 5, vertical flow nets superimposed on cross-sections of the former HPFF site indicate a strongly downward flow component. Locations of these cross-sections are shown on Figure 3. Figure 4 (cross-section A-A') shows that as groundwater migrates west-southwest (coming out of the page toward the reader), it also moves downward, "funneled" toward the area beneath MW-18. The sink is not just a surface feature but is an indication of the three-dimensional flow pattern. The apparent groundwater sink (beneath the former HPFF) thus serves as a localized entrance point for groundwater recharge.

Figure 5 (cross-section B-B') shows the flow pattern below the groundwater sink (near MW-17 and SB-5) and the "mound" (near MW-5 and RW-1). According to the contours, groundwater flow beneath the former HPFF is generally from right to left across the page in a west-southwest direction. In the former HPFF area, regardless of the water table surface being a sink or mound, water infiltrating to recharge the groundwater flow deepens as it flows downgradient. This is corroborated by the vertical distribution of dissolved benzene at the former HPFF (discussed in detail later).

At the Building 1115 site, a more extensive study of vertical gradients was undertaken (RCA, 1995). The vertical gradients measured between 30 and 50 feet below ground surface (bgs) ranged from 0.010 to 0.100. The vertical gradients measured between 50 and 80 feet bgs ranged from 0.030 to 0.050. Figures 6 and 7 show vertical flow nets of the Building 1115 site. The downward flow component is evident in both figures. The locations of these cross-sections are shown on Figure 3. Figure 6 (cross-section C-C') is oriented perpendicular to the general groundwater flow direction (west-southwest, coming out of the page) and clearly shows that groundwater also moves downward.

Figure 7 (cross-section D-D') is oriented almost parallel to the general groundwater flow direction (west-southwest, left to right) and shows the vertical and horizontal components of groundwater flow. This is further corroborated by extensive vertical (downward) migration of dissolved BTEX constituents that has been documented at both sites. This will be discussed in more detail in a later section.

Floating Product

The volume estimate of petroleum product floating on the water table using the pre-pumping (1988-91) data was 1,061,901 gallons of product (mostly gasoline according to an earlier analysis by O&G) spread over 11,933,614 ft^2 (274 acres = 0.43 mi^2). While this estimated volume seems incredibly large, it must be remembered that this took place over 50 years, yielding an average loss of over 21,200 gallons/year (or 58 gallons/day). Figure 8 shows the product thicknesses for the 1988-91 period and indicates that there may have been at least three source areas for the spills: near MW-12 (maximum floating product thickness > 7 feet), MW-16 (>13 feet) and MW-18 (>4 feet).

Figure 8 shows that two of these three indicated source areas (near MW-12 and MW-16) are directly beneath the unloading zones for railroad tank cars on the tracks adjacent to the tank farm. The third indicated source area (near MW-18) is near the southeastern edge of the fuel farm.

Figure 9 shows the results of the data from 1992 to the present: the estimated volume of floating product is now 830,324 gallons over an area of 11,392,186 ft^2 (262 acres = 0.41 mi^2). The area for the former HPFF floating product has diminished but there is now floating product apparently emanating from Building 1115 that has kept the total area about the same as the original estimate. This floating product at the Building 1115 site may have existed before 1993, which would make the original estimate biased lower than the actual total volume.

From a comparison of Figures 8 and 9 it appears that there has been some movement of the floating product atop the water table at the former HPFF in four areas (possibly indicating the effects of the four pumping wells RW-1 though RW-4). Southward product phase migration is indicated near MW-1. Figure 10 shows the increase in product thickness versus time in MW-1. This seems to be attributable to the pumping and the resulting induced migration toward RW-2.

No movement is indicated near MW-2. Figure 11 shows that the product thickness in MW-2 has remained relatively constant over time. Apparently this area is out of the capture zone of the existing pumping wells.

Another area where it appears the product has migrated is near MW-12. This could be the result of product phase migration toward RW-4. Figure 12 shows the decrease in product thickness in MW-12 versus time. The two apparent source areas beneath the railroad tracks that were separate (near wells MW-12 and MW-16 in Figure 8) seem to have coalesced into one area. However, the current areal shape of the floating product in Figure 9 could be an artifact caused by the lack of current data at former monitoring wells MW-7 and MW-8. Apparently these wells were destroyed and possibly replaced, but were not used as data collection points after 1989. It is not known whether the replacement wells still exist or not. These two former monitoring wells provided data that detailed the shape of the floating product that does not currently exist.

Product phase migration may be indicated near MW-16 toward RW-1 as shown in Figure 13 by the decreasing product thickness versus time. This also may be shown by the comparison of Figures 8 and 9.

Movement of the product phase is also indicated near MW-18. Figure 14 shows the decrease in product thickness versus time in MW-18. This is consistent with the pumping and induced migration toward RW-3.

It is not known whether any product phase petroleum has migrated off-site from the former HPFF. As shown on Figure 9, the product may have migrated in a southwest direction from MW-12 toward or even across Ash Street to coalesce with the product phase migrating from Building 1115. This has not been confirmed by actual well measurements but has been suggested by the data. Since MW-8 was destroyed, no wells exist between MW-5 and MW-11 to confirm this theory.

SpillCAD calculated that, of the more than 830,000 gallons of floating product, just over 500,000 gallons are recoverable because of the soil and fluid properties.

Dissolved Plume

In this preliminary analysis only dissolved benzene concentrations were input into the database.

1988-1991 Data

The dissolved benzene plume from the 1988-91 data set is shown in Figure 15. The shape of this plume is very similar to the shape of the floating product in Figure 8. The highest benzene concentrations are directly beneath the thickest parts of the floating product.

From 1988 to 1991, no deep wells existed at the former HPFF to determine the benzene concentrations at depth.

1993-1996 Data

The dissolved benzene plume(s) appear quite different with the more recent data (Figure 16) than in the previous figure. The original plume (at the surface) seems to have diminished in concentration although this may be an artifact caused by the fact that in the recent data set the wells with floating product were not sampled. This may mean that the highest concentrations in the dissolved benzene plume are not be represented on this figure. Nonetheless, a reduction in the benzene concentrations in the plume would be expected due to weathering of the floating product phase over time and due to migration of the highest concentrations away from the source.

From Figure 16, two new benzene plumes are now evident: one beneath Building 1115 and one beneath the new fuel farm (adjacent to the former HPFF). These appear to be more recent releases because of the higher benzene concentrations near the surface than in the older release at the former HPFF. At the Building 1115 site, the effect of the localized groundwater divide can be seen in the southeastern (and possibly northwest) spreading of the benzene plume. Four wells at the Building 1115 site were installed at 80 feet bgs and have detected dissolved benzene at significant concentrations ranging from 523 ppb to 8,220 ppb.

The highest concentrations associated with the original plume appear to have migrated away from the source area both laterally and vertically. Figure 17 shows the dissolved concentrations at an approximate depth of 50 feet bgs. This theory makes sense because the groundwater flow direction at this depth is southwest as shown on Figure 18. The "heart" of the benzene plume now appears to be beneath Buildings 1101 and 1108, more than 600 lateral feet from the former HPFF. The northern end of the deep benzene plume appears to be moving in a northwesterly direction, which is consistent with the divergence of flow shown on Figure 17.

Figures 19 through 22 show vertical cross-sections through the dissolved benzene plumes. Figure 19 shows cross-section A-A' through the former (and current) HPFF. Two plumes are represented here, one form the former HPFF (MW-18) and the other from the unloading area near the railroad tracks (HP-9). Since this cross-section is perpendicular to groundwater flow, this figure represents cross-sections of the benzene plumes as well. The vertical extent of the plumes have not been delineated.

Figure 20 is oriented more or less parallel to groundwater flow and shows the profile of two benzene plumes, one from the former HPFF (MW-17, 22GW-1) and another from the new HPFF (HP-4). The vertical extent of the benzene plumes have not been delineated.

Figure 21 (oriented perpendicular to flow) shows the cross-sections of at least two benzene plumes, one at depth between Buildings 1101 and 1108 (well 1115-20), and another at depth beneath Holcomb Boulevard (well 1115-17). There may be a third benzene plume associated with well 1115-11 at the surface and it is unclear what, if any, connection exists between this and the deep plumes. The vertical extent of these benzene plumes have not been delineated.

Figure 22 is parallel to groundwater flow and shows the profile of what appears to be three plumes: one shallow plume from the Building 1115 area (wells 1115-12 and 1115-5), one at depth possible emanating form the former HPFF (well 1115-18) and another at depth possibly emanating from the Building 1115 area near 1115-11 (wells 1115-21 and 1115-24).

In summary, there appear to be five source areas from which benzene is originating: one within the former HPFF, one from the unloading area adjacent to the former HPFF, one from the new HPFF, and two from the Building 1115 area. The vertical extent of the dissolved benzene has not been delineated below these benzene plumes. The benzene has migrated to at least 80 feet bgs in two areas: beneath well 1115-17 and beneath Buildings 1101 and 1108. The horizontal extent has not been delineated in three areas: southwest of Buildings 1101 and 1108, north of Building 1115, and west of Holcomb Boulevard.

RECOMMENDATIONS

Due to the typical shallow approach to UST investigations, and due to the unexpectedly large vertical gradients near the HPFF and Building 1115 sites, the dissolved contamination has migrated almost vertically downward and has not been delineated by the existing wells at these two sites. The following recommendations would help to provide additional necessary information:

A well inventory and survey should be conducted over the entire HPFF/Bldg. 1115 area. This will make the water table elevations and product thickness calculations consistent. Typically, the wells were surveyed soon after installation. They have not all been surveyed at the same time using the same surveyor.

To date, the wells have been sampled piecemeal in accordance with the different site schedules. A complete resampling event with all wells would allow a consistent picture to be seen. BTEX analyses and samples of the floating product from the separate areas is recommended. The analysis of the product should be a fingerprint to determine product type.

Because of the substantial volume of floating product still present, the extraction wells/system should be enhanced with vacuum recovery and/or bioslurping. Computer modeling (using MOVER or another equivalent model) may be helpful in determining the time involved for that process to take place and whether any additional extraction points are needed.

Additional wells, both deep and shallow are needed to delineate the horizontal and vertical extents of the dissolved benzene (and other contaminant) plumes. The following additional wells are recommended:

- one shallow monitoring well between MW-5 and MW-11 to determine if floating product has migrated southward toward Ash Street (or determine if MW-8R still exists)

- eight to ten additional deep wells to delineate the plumes beneath Buildings 1101, 1108, and 1115 (temporary wells could be used to place the wells at the proper depths)

In order to get a realistic representation of the dissolved plume directly beneath the floating product, it is necessary to sample below the product using an innovative method. One such method would be to lower a small diameter PVC pipe into the shallow wells with floating product. The use of positive pressure while lowering the pipe would keep the product out. The smaller diameter pipe would then be used to collect water samples with a bailer or peristaltic pump.

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Appendix A -- Re-evaluated Pumping Test Results for RW-1 and RW-2

Figure A-1 -- Cooper-Jacob Straight-Line Solution for RW-1 Drawdown Data
Figure A-2 -- Cooper-Jacob Straight-Line Solution for RW-2 Drawdown Data

Figure 1 -- HPFF and Building 1115 Site Map with Wells

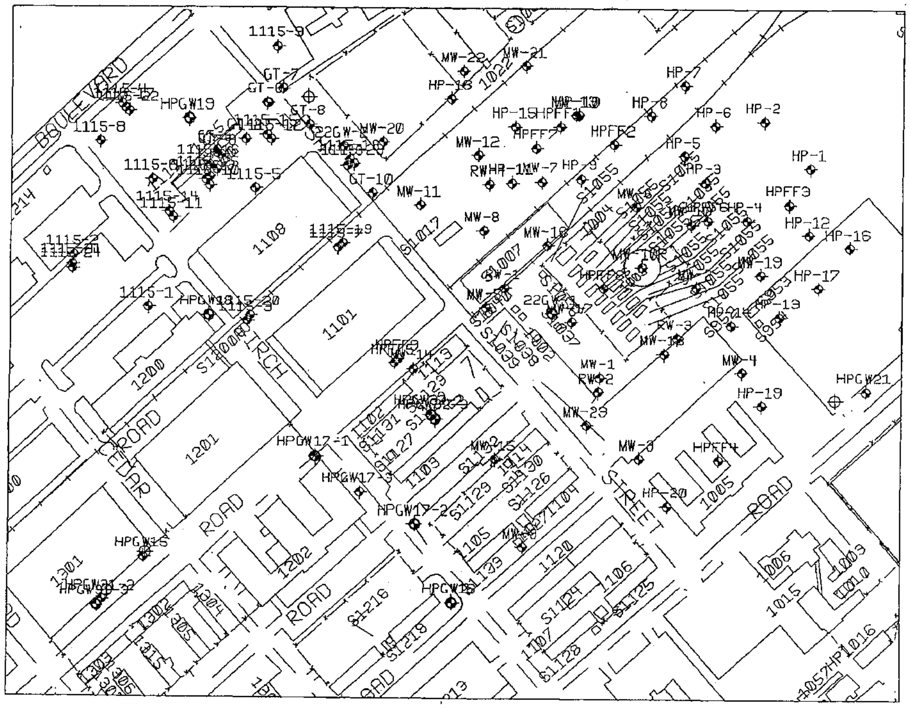
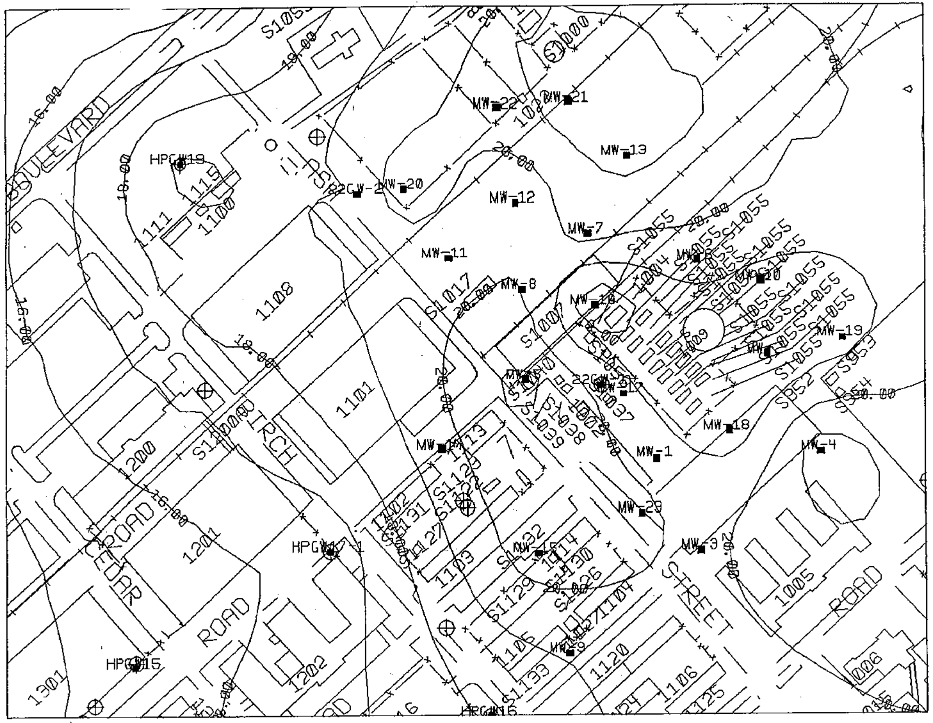


Figure 2 -- Average Water Table Elevations 1988-1991



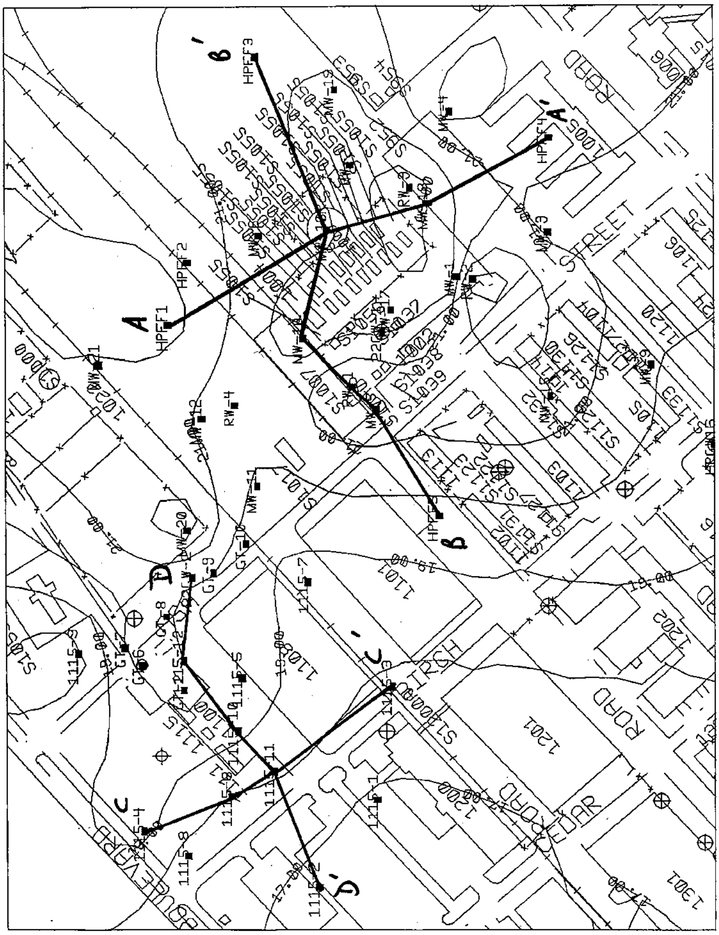
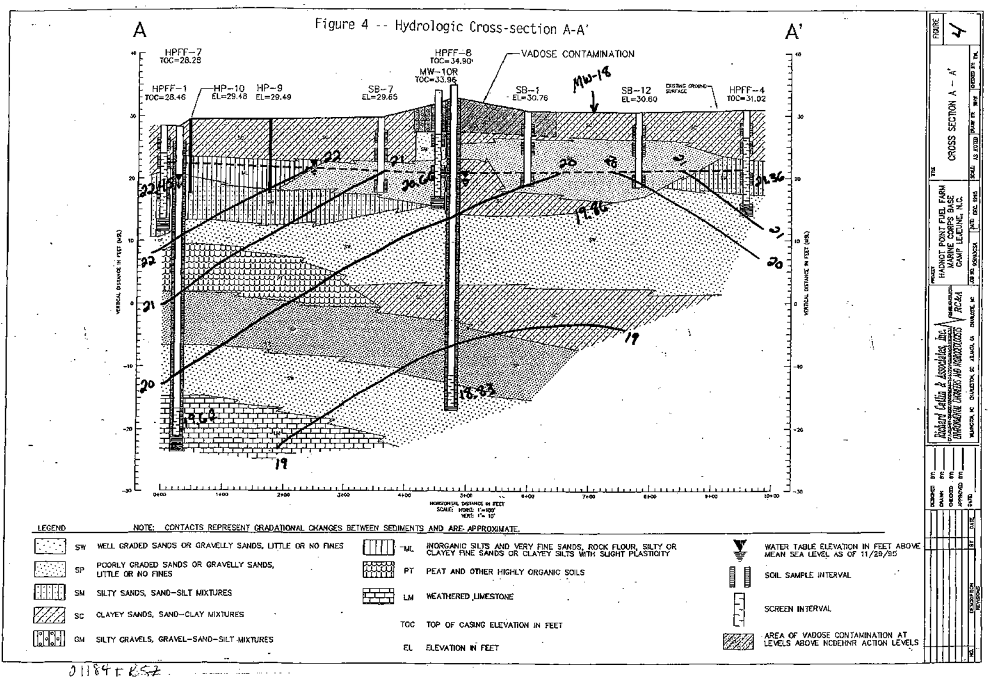


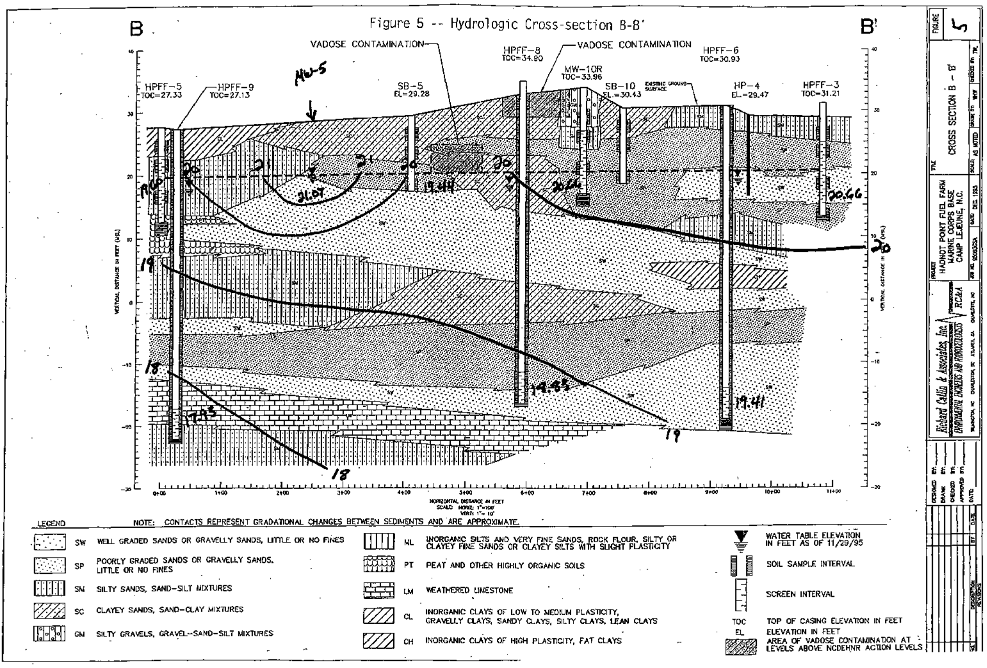
Figure 3 -- Average Water Table Elevations 1995-1996

Figure 4 -- Hydrologic Cross-section A-A'


A
A'
HPFF-7
TOC=28.28
HPFF-1
TOC=28.46
HP-10
EL=29.48
HP-9
EL=29.49
SB-7
EL=29.65
HPFF-8
TOC=34.90
MW-10R
TOC=33.96
VADOSE CONTAMINATION
SB-1
EL=30.76
MW-18
SB-12
EL=30.60
EXISTING GROUND SURFACE
HPFF-4
TOC=31.02
22
21
20
19
20.66
19.86
18.83
21.36
VERTICAL DISTANCE IN FEET (MSL)
40
30
20
10
0
-10
-20
-30
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
HORIZONTAL DISTANCE IN FEET
SCALE: HORIZ: 1"=100'
VERT: 1"= 10'
LEGEND
NOTE: CONTACTS REPRESENT GRADATIONAL CHANGES BETWEEN SEDIMENTS AND ARE APPROXIMATE.
SW WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM SILTY SANDS, SAND-SILT MIXTURES
SC CLAYEY SANDS, SAND-CLAY MIXTURES
GM SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
ML INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
PT PEAT AND OTHER HIGHLY ORGANIC SOILS
LM WEATHERED LIMESTONE
TOC TOP OF CASING ELEVATION IN FEET
EL ELEVATION IN FEET
WATER TABLE ELEVATION IN FEET ABOVE MEAN SEA LEVEL AS OF 11/29/95
SOIL SAMPLE INTERVAL
SCREEN INTERVAL
AREA OF VADOSE CONTAMINATION AT LEVELS ABOVE NCDEHNR ACTION LEVELS
NO.
DESCRIPTION
REVISIONS
BY
DATE
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
DATED
Richard Catlin & Associates, Inc.
ENVIRONMENTAL ENGINEERS AND HYDROGEOLOGISTS
RC&A
WILMINGTON, NC CHARLESTON, SC ATLANTA, GA CHARLOTTE, NC
PROJECT
HADNOT POINT FUEL FARM
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
JOB NO. 95043CSA
DATE DEC. 1995
TITLE
CROSS SECTION A - A'
SCALE AS NOTED
DRAWN BY WHW
CHECKED BY TM
FIGURE
4

01184 E BSZ

Figure 5 -- Hydrologic Cross-section B-B'


B
B'
VADOSE CONTAMINATION
VADOSE CONTAMINATION
HPFF-5 TOC=27.33
HPFF-9 TOC=27.13
MW-5
SB-5 EL=29.28
HPFF-8 TOC=34.90
MW-10R TOC=33.96
SB-10 EL=30.43
EXISTING GROUND SURFACE
HPFF-6 TOC=30.93
HP-4 EL=29.47
HPFF-3 TOC=31.21
VERTICAL DISTANCE IN FEET (MSL)
20.60
20
21
21.07
21
20
19.44
20
20.64
20.66
20
19
19.85
19.41
19
18
17.95
18
HORIZONTAL DISTANCE IN FEET
SCALE: HORIZ: 1"=100'
VERT: 1"= 10'
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
NOTE: CONTACTS REPRESENT GRADATIONAL CHANGES BETWEEN SEDIMENTS AND ARE APPROXIMATE.
LEGEND
SW WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM SILTY SANDS, SAND-SILT MIXTURES
SC CLAYEY SANDS, SAND-CLAY MIXTURES
GM SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
ML INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
PT PEAT AND OTHER HIGHLY ORGANIC SOILS
LM WEATHERED LIMESTONE
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
WATER TABLE ELEVATION IN FEET AS OF 11/29/95
SOIL SAMPLE INTERVAL
SCREEN INTERVAL
TOC TOP OF CASING ELEVATION IN FEET
EL ELEVATION IN FEET
AREA OF VADOSE CONTAMINATION AT LEVELS ABOVE NCDEHNR ACTION LEVELS
REVISIONS
DESCRIPTION
BY
DATE
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
DATE:
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PROJECT
HADNOT POINT FUEL FARM
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
JOB NO. 92083CSA
DATE: DEC. 1995
TITLE
CROSS SECTION B - B'
SCALE: AS NOTED
DRAWN BY: WHY
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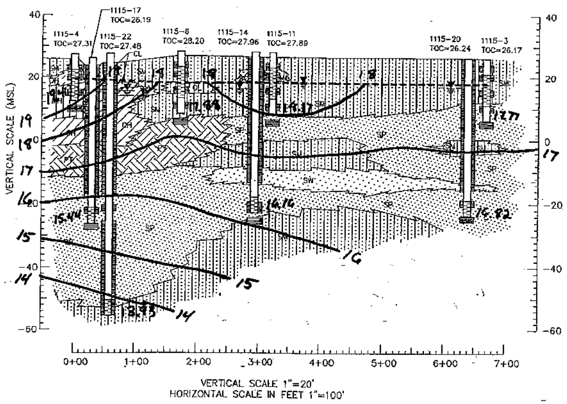
FIGURE
5

C   Figure 6 -- Hydrologic Cross-section C-C'   C'



NOTE: CONTACTS REPRESENT GRADATIONAL CHANGES BETWEEN UNITS AND ARE APPROXIMATE.

LEGEND

▨	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS
▨	SW	WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
▨	SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
▨	SM	SILTY SANDS, SAND-SILT MIXTURES
▨	SC	CLAYEY SANDS, SAND-CLAY MIXTURES
▨	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY.
▨	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
▨	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
▨	CH	INORGANIC CLAYS OF FINE PLASTICITY, FAT CLAYS
▨	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
▨	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		SOIL SAMPLE INTERVAL
		SCREEN INTERVAL
	TOC	TOP OF CASING ELEVATION IN FEET (MSL)
▼		GROUND WATER ELEVATION AS OF 7/18/95

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WILMINGTON, NC CHARLESTON, SC ATLANTA, GA MOORESVILLE, NC

PROJECT: BUILDING 1115
LANTDIV NAVFACENGCOM
CAMP LEJEUNE, N.C.

TITLE: CROSS SECTION C-C'

FIGURE: 6

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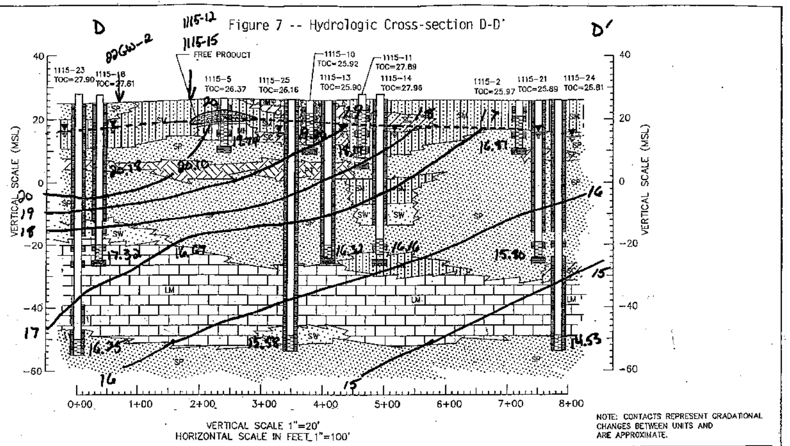
Figure 7 -- Hydrologic Cross-section D-D'



VERTICAL SCALE 1"=20'
HORIZONTAL SCALE IN FEET 1"=100'

NOTE: CONTACTS REPRESENT GRADATIONAL CHANGES BETWEEN UNITS AND ARE APPROXIMATE.

LEGEND

▨	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS
░	SW	WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
▒	SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
▥	SM	SILTY SANDS, SAND-SILT MIXTURES
▨	SC	CLAYEY SANDS, SAND-CLAY MIXTURES
▥	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY.
▥	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
▥	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
▨	CH	INORGANIC CLAYS OF FINE PLASTICITY, FAT CLAYS
▨	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
▨	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
▦	LM	WEATHERED LIMESTONE
▦	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
▓		FREE PRODUCT
▮ ▮		SOIL SAMPLE INTERVAL
▤		SCREEN INTERVAL
	TOC	TOP OF CASING ELEVATION IN FEET (MSL)
▼		GROUND WATER ELEVATION AS OF 7/18/95

Richard Catlin & Associates, Inc. ENVIRONMENTAL ENGINEERS AND HYDROGEOLOGISTS RC&A WILMINGTON, NC CHARLESTON, SC ATLANTA, GA MOORESVILLE, NC	PROJECT BUILDING 1115 LANTDIV NAVFACENGCOM CAMP LEJEUNE, N.C.	TITLE CROSS SECTION D-D'			FIGURE 7
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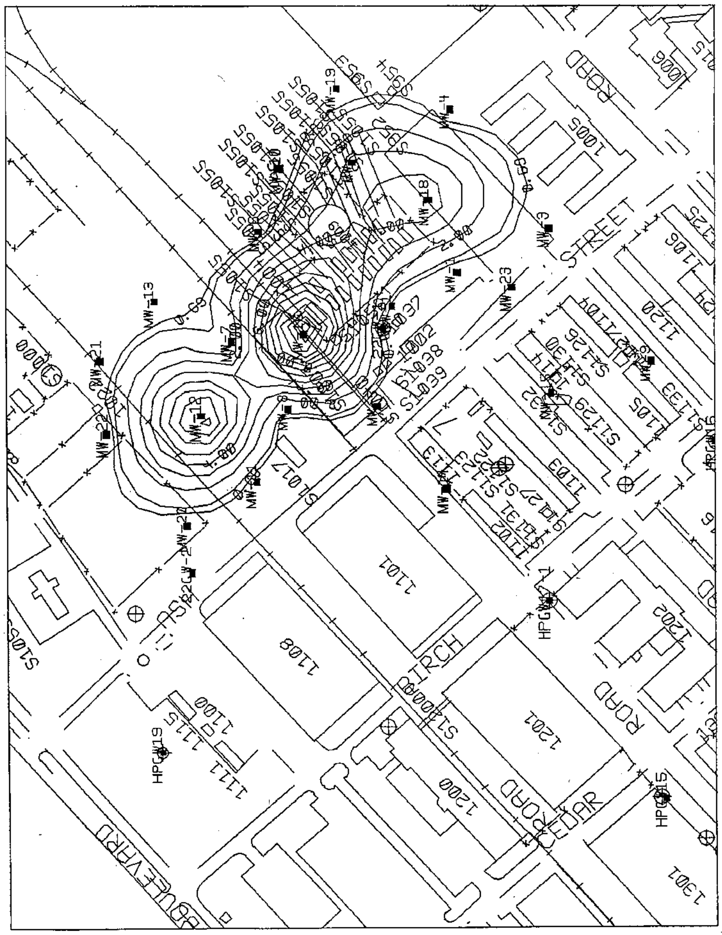


Figure 8 -- Maximum Product Thickness 1988-1991

Figure 9 -- Maximum Product Thickness 1995-1996

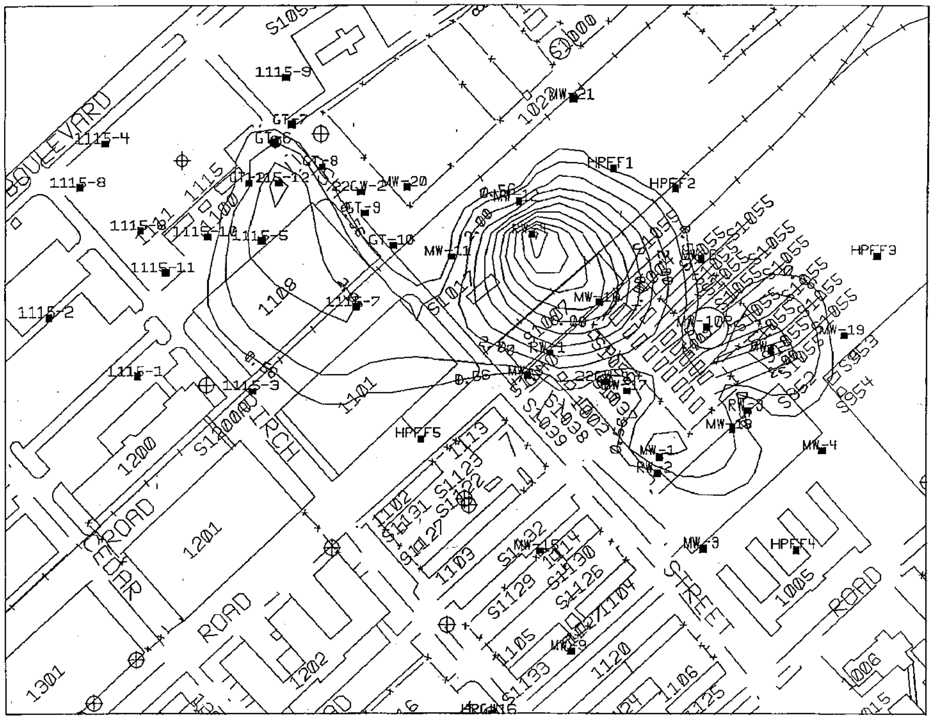


Figure 10 -- Product Thickness versus Time in MW-1

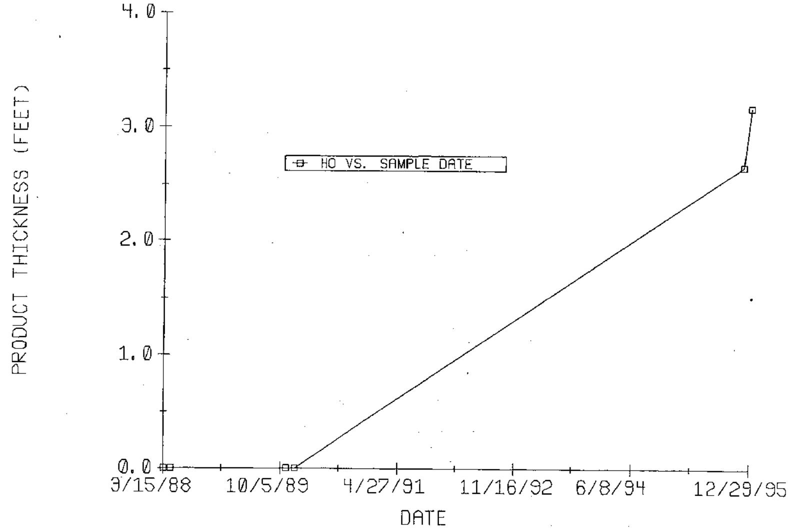
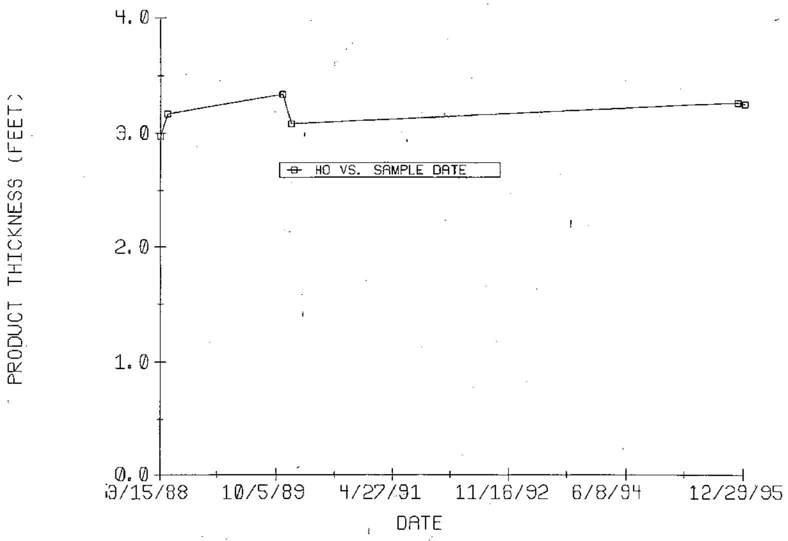


Figure 11 -- Product Thickness versus Time in MW-2



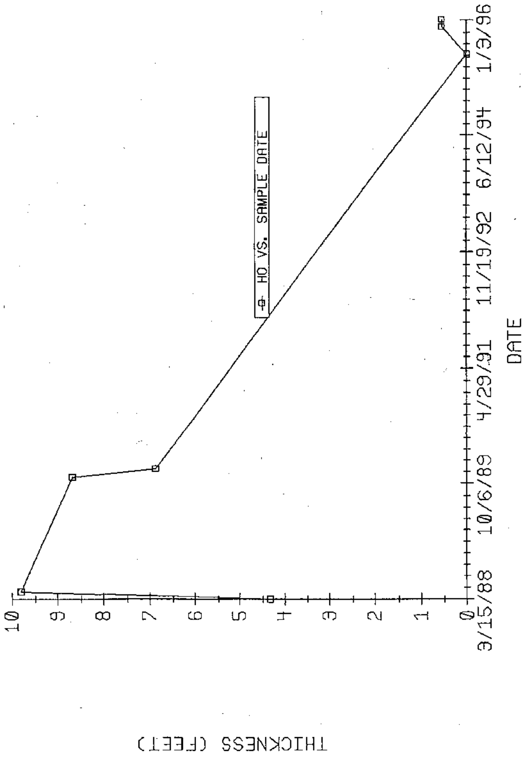


Figure 12 -- Product Thickness versus Time in MW-12

Figure 13 -- Product Thickness versus Time in MW-16

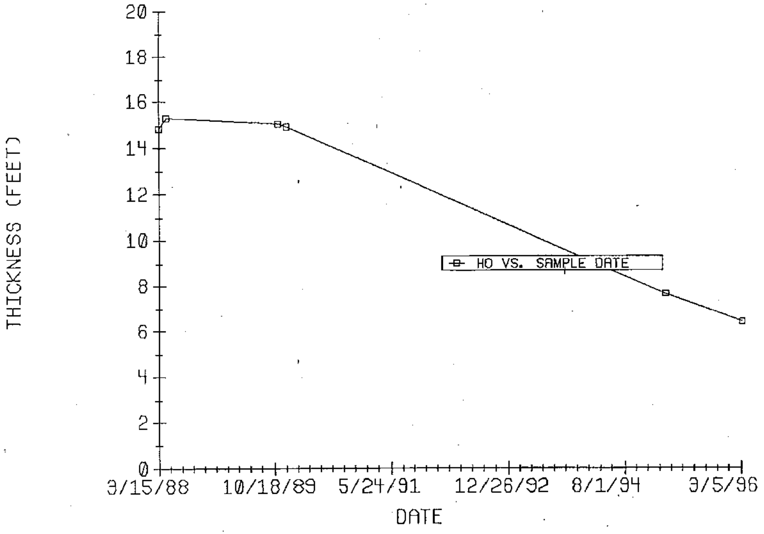
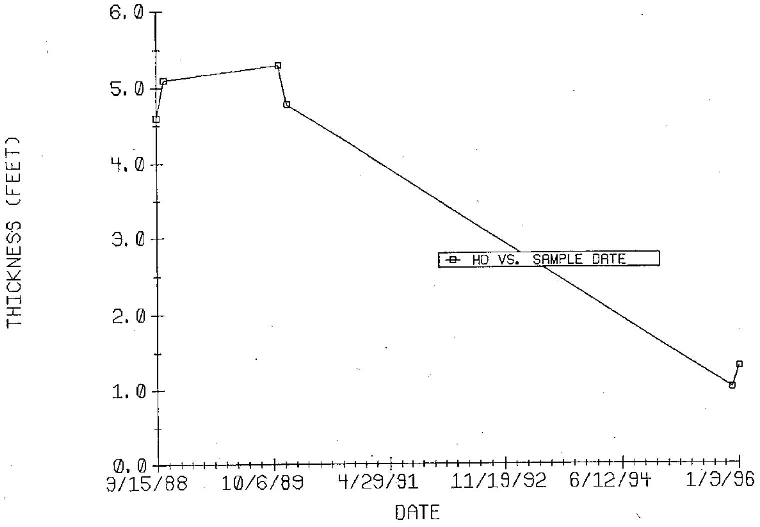


Figure 14 -- Product Thickness versus Time in MW-18



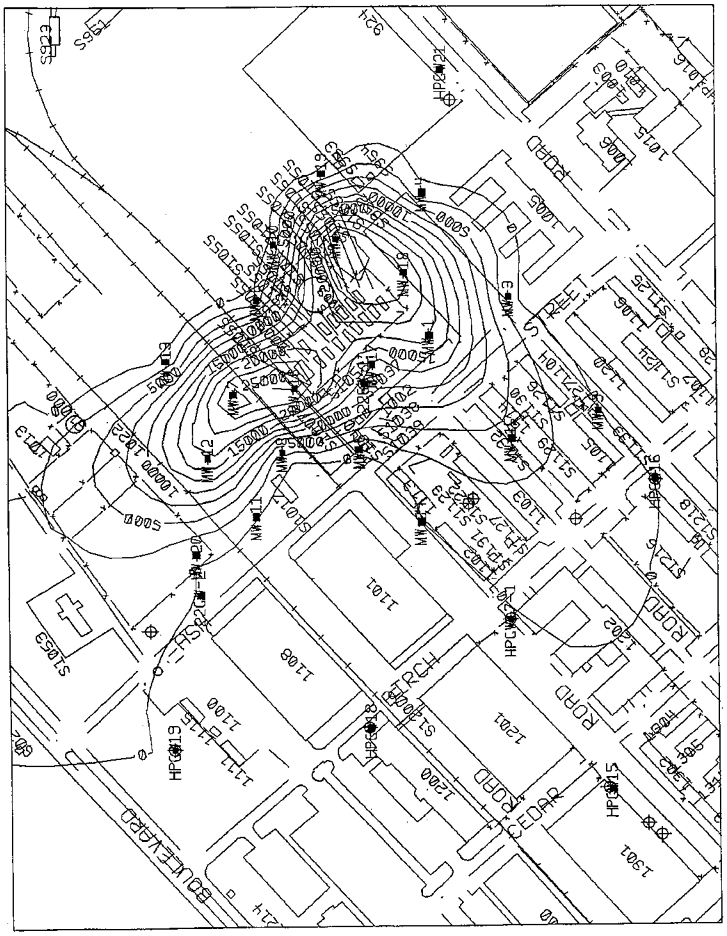


Figure 15 -- Shallow Benzene 1988-1991

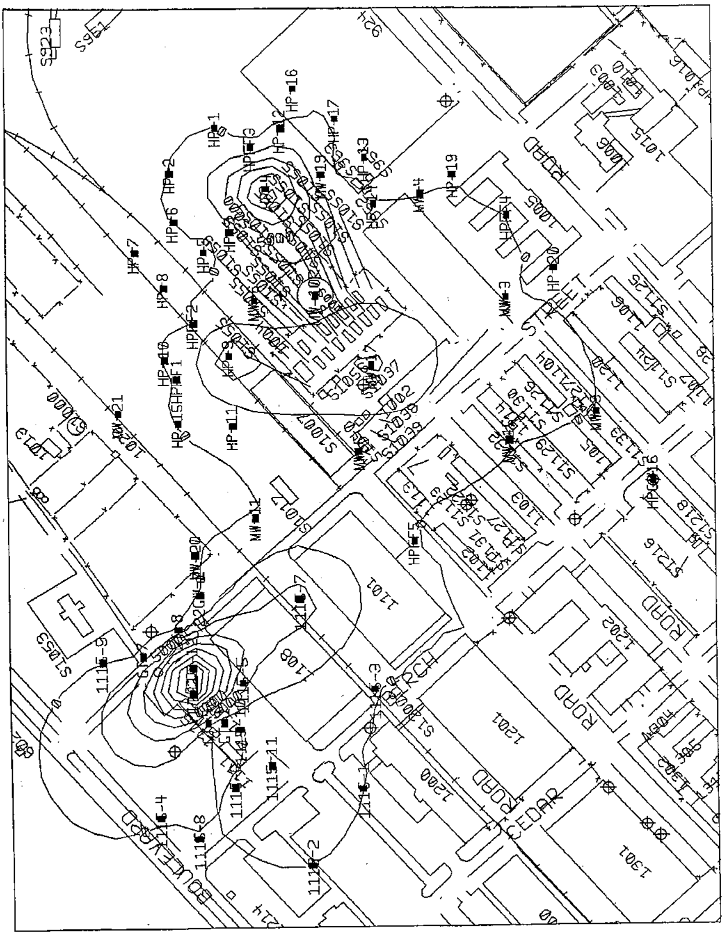
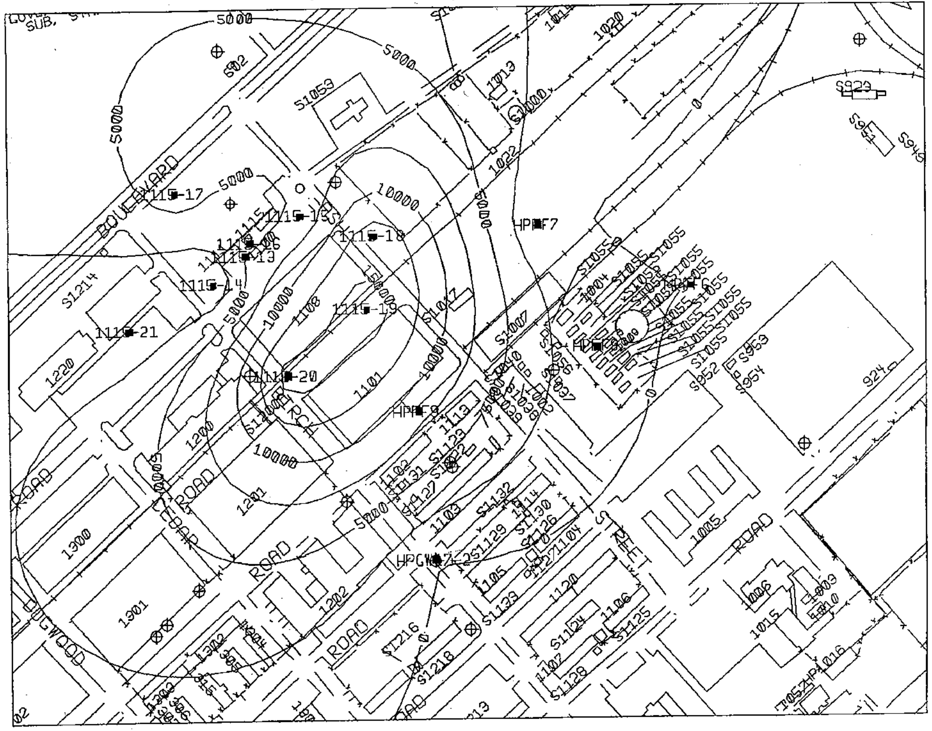


Figure 16 -- Shallow Benzene 1993-1995

Figure 17 -- Deep Benzene 1993-1995



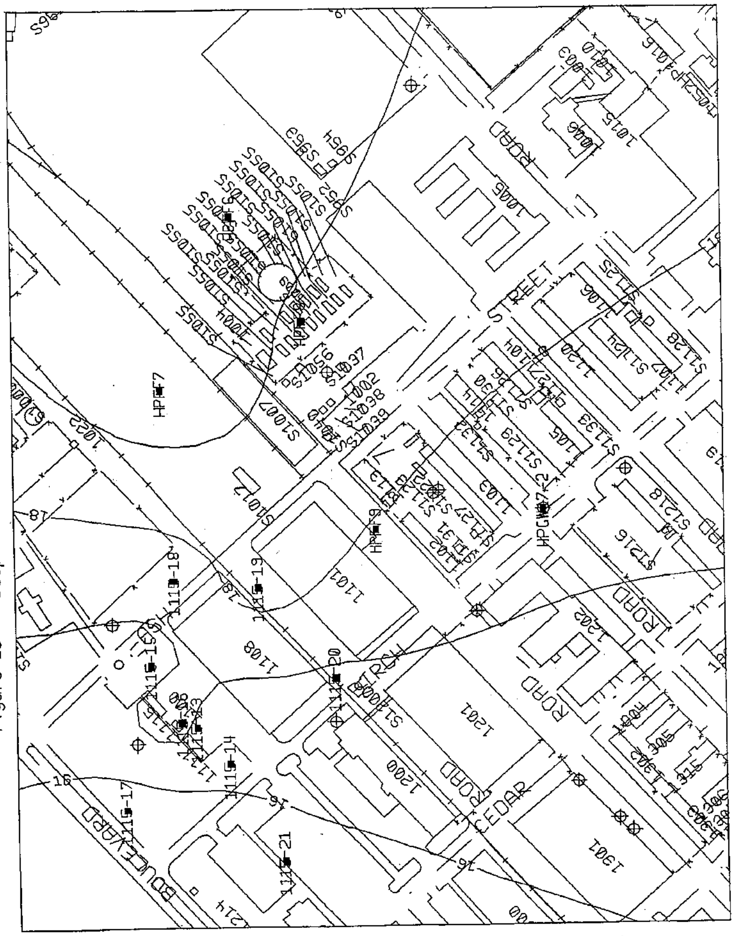


Figure 18 -- Deep Groundwater Elevations 1995 1996

Figure 19 -- Hydrogeochemical Cross-section A-A'

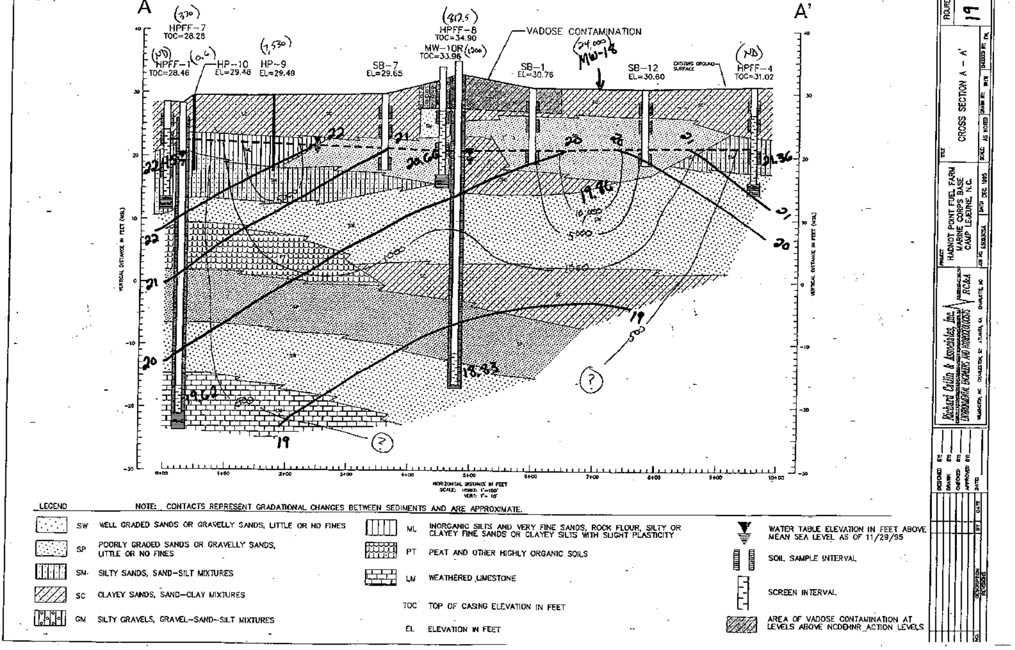

A
A'
(370)
HPFF-7
TOC=28.28
(ND)
HPFF-1
TOC=28.46
(0.6)
HP-10
EL=29.48
(7,530)
HP-9
EL=29.49
SB-7
EL=29.65
(812.5)
HPFF-8
TOC=34.90
MW-10R (1200)
TOC=33.96
VADOSE CONTAMINATION
(24,000)
MW-18
SB-1
EL=30.76
SB-12
EL=30.60
EXISTING GROUND SURFACE
(ND)
HPFF-4
TOC=31.02
22
21
20
19
20.66
19.86
18.83
19.62
21.36
?
VERTICAL DISTANCE IN FEET (MSL)
HORIZONTAL DISTANCE IN FEET
SCALE: HORIZ: 1"=100'
VERT: 1"=10'
LEGEND
NOTE: CONTACTS REPRESENT GRADATIONAL CHANGES BETWEEN SEDIMENTS AND ARE APPROXIMATE.
SW WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM SILTY SANDS, SAND-SILT MIXTURES
SC CLAYEY SANDS, SAND-CLAY MIXTURES
GM SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
ML INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
PT PEAT AND OTHER HIGHLY ORGANIC SOILS
LM WEATHERED LIMESTONE
TOC TOP OF CASING ELEVATION IN FEET
EL ELEVATION IN FEET
WATER TABLE ELEVATION IN FEET ABOVE MEAN SEA LEVEL AS OF 11/29/95
SOIL SAMPLE INTERVAL
SCREEN INTERVAL
AREA OF VADOSE CONTAMINATION AT LEVELS ABOVE NCDEHNR ACTION LEVELS
Richard Catlin & Associates, Inc.
ENVIRONMENTAL ENGINEERS AND HYDROGEOLOGISTS
RC&A
WILMINGTON, NC CHARLESTON, SC ATLANTA, GA CHARLOTTE, NC
PROJECT
HADNOT POINT FUEL FARM
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
TITLE
CROSS SECTION A - A'
JOB NO. L5093CSA
DATE DEC. 1995
SCALE AS NOTED
DRAWN BY: WEW
CHECKED BY: FM
FIGURE
19
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
DATE:
NO.
DESCRIPTION
REVISIONS
BY
DATE

Figure 20 -- Hydrogeochemical Cross-section B-B'

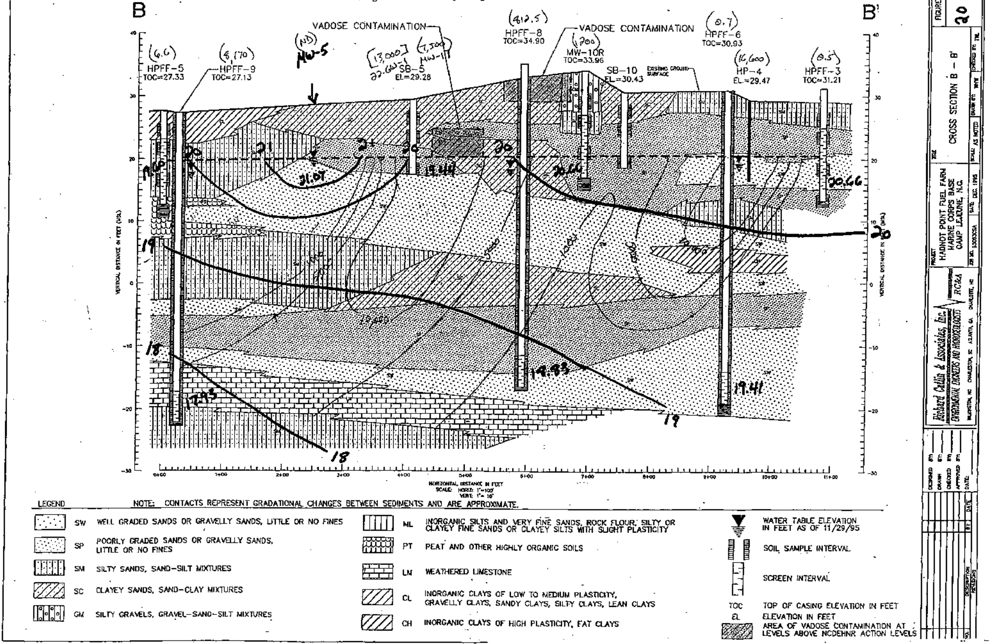

B
B'
(6.6)
HPFF-5
TOC=27.33
(8,170)
HPFF-9
TOC=27.13
(ND)
MW-5
VADOSE CONTAMINATION
[13,000]
22-GW-1
(7,500)
MW-11
SB-5
EL=29.28
(412.5)
HPFF-8
TOC=34.90
VADOSE CONTAMINATION
(200)
MW-10R
TOC=33.96
SB-10
EL=30.43
EXISTING GROUND SURFACE
(0.7)
HPFF-6
TOC=30.93
(16,600)
HP-4
EL=29.47
(0.5)
HPFF-3
TOC=31.21
21
21
20
20
20
21.07
19.44
20.66
20.66
20
19
19
18
18
17.95
19.83
19.41
VERTICAL DISTANCE IN FEET (MSL)
40
30
20
10
0
-10
-20
-30
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
HORIZONTAL DISTANCE IN FEET
SCALE: HORIZ: 1"=100'
VERT: 1"=10'
LEGEND
NOTE: CONTACTS REPRESENT GRADATIONAL CHANGES BETWEEN SEDIMENTS AND ARE APPROXIMATE.
SW WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM SILTY SANDS, SAND-SILT MIXTURES
SC CLAYEY SANDS, SAND-CLAY MIXTURES
GM SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
ML INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
PT PEAT AND OTHER HIGHLY ORGANIC SOILS
LM WEATHERED LIMESTONE
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
CH INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
WATER TABLE ELEVATION IN FEET AS OF 11/29/95
SOIL SAMPLE INTERVAL
SCREEN INTERVAL
TOC TOP OF CASING ELEVATION IN FEET
EL ELEVATION IN FEET
AREA OF VADOSE CONTAMINATION AT LEVELS ABOVE NCDEHNR ACTION LEVELS
FIGURE
20
TITLE
CROSS SECTION B – B'
PROJECT
HADNOT POINT FUEL FARM
MARINE CORPS BASE
CAMP LEJEUNE, N.C.
JOB NO. 95093CSA
DATE DEC. 1995
SCALE AS NOTED
DRAWN BY: WHW
CHECKED BY: TML
Richard Catlin & Associates, Inc.
ENVIRONMENTAL ENGINEERS AND HYDROGEOLOGISTS
RC&A
WILMINGTON, NC CHARLESTON, SC ATLANTA, GA CHARLOTTE, NC
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
DATE:
NO.
DESCRIPTION
REVISIONS
BY
DATE

Figure 21 -- Hydrogeochemical Cross-section C-C'

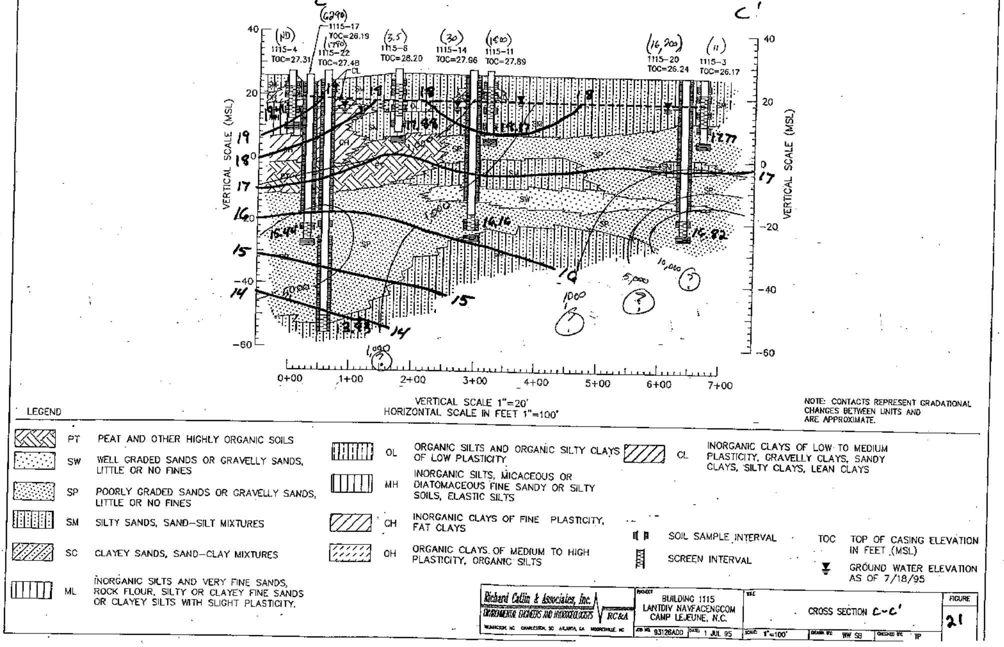
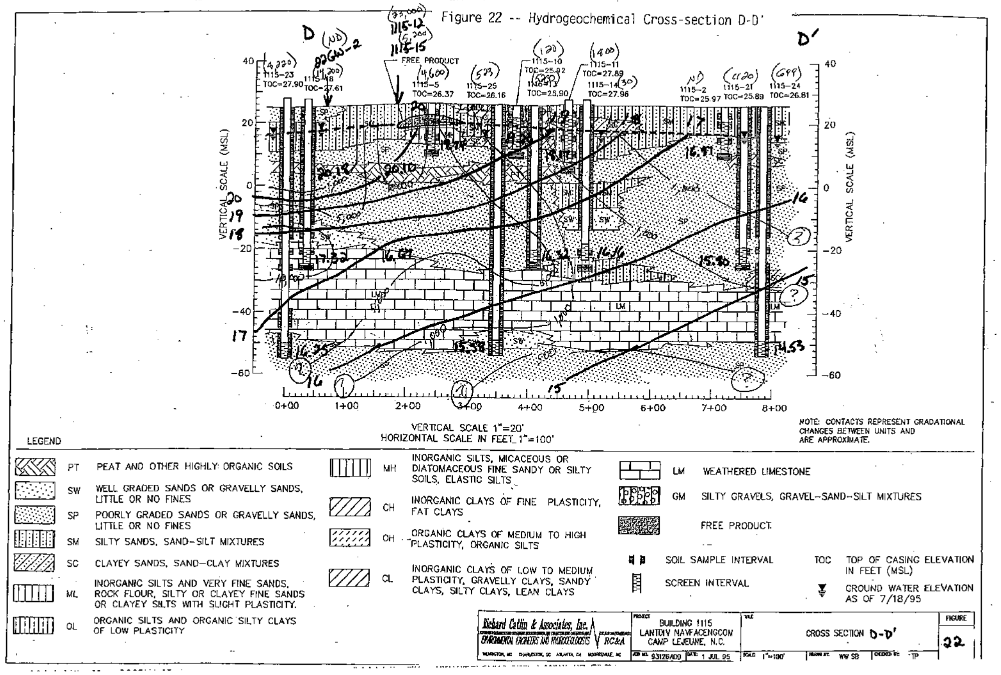

C
C'
(6290)
(ND)
1115-4
TOC=27.31
1115-17
TOC=26.19
(1790)
1115-22
TOC=27.48
CL
(3.5)
1115-8
TOC=28.20
(30)
1115-14
TOC=27.96
(1800)
1115-11
TOC=27.89
(16,200)
1115-20
TOC=26.24
(11)
1115-3
TOC=26.17
40
20
0
-20
-40
-60
VERTICAL SCALE (MSL)
19
18
17
16
15
14
SM
CH
PT
OL
SP
SW
15.44
11.94
14.17
12.77
16.16
14.82
12.93
1000
5,000
10,000
1,000
?
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
VERTICAL SCALE 1"=20'
HORIZONTAL SCALE IN FEET 1"=100'
NOTE: CONTACTS REPRESENT GRADATIONAL CHANGES BETWEEN UNITS AND ARE APPROXIMATE.
LEGEND
PT PEAT AND OTHER HIGHLY ORGANIC SOILS
SW WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM SILTY SANDS, SAND-SILT MIXTURES
SC CLAYEY SANDS, SAND-CLAY MIXTURES
ML INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY.
OL ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MH INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
CH INORGANIC CLAYS OF FINE PLASTICITY, FAT CLAYS
OH ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
SOIL SAMPLE INTERVAL
SCREEN INTERVAL
TOC TOP OF CASING ELEVATION IN FEET (MSL)
GROUND WATER ELEVATION AS OF 7/18/95
Richard Catlin & Associates, Inc.
ENVIRONMENTAL ENGINEERS AND HYDROGEOLOGISTS
RC&A
WILMINGTON, NC CHARLESTON, SC ATLANTA, GA MOORESVILLE, NC
PROJECT
BUILDING 1115
LANTDIV NAVFACENGCOM
CAMP LEJEUNE, N.C.
TITLE
CROSS SECTION C-C'
FIGURE
21
JOB NO. 93126ADD
DATE: 1 JUL 95
SCALE: 1"=100'
DRAWN BY: WW SB
CHECKED BY: TP

Figure 22 -- Hydrogeochemical Cross-section D-D'


D
D'
(ND)
82GW-2
(33,000)
1115-12
(5,200)
1115-15
FREE PRODUCT
(4,220)
1115-23
TOC=27.90
(14,200)
1115-18
TOC=27.61
(4,600)
1115-5
TOC=26.37
(523)
1115-25
TOC=26.16
(120)
1115-10
TOC=25.92
(5260)
1115-13
TOC=25.90
(1400)
1115-11
TOC=27.89
1115-14 (30)
TOC=27.96
ND
1115-2
TOC=25.97
(1120)
1115-21
TOC=25.89
(699)
1115-24
TOC=26.81
40
20
0
-20
-40
-60
VERTICAL SCALE (MSL)
20
19
18
17
16
15
20.12
20.10
19.74
18.37
16.97
17.32
16.09
16.35
15.38
16.32
16.16
15.90
14.53
SP
SW
SM
SC
ML
MH
PT
LM
GM
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
VERTICAL SCALE 1"=20'
HORIZONTAL SCALE IN FEET 1"=100'
NOTE: CONTACTS REPRESENT GRADATIONAL CHANGES BETWEEN UNITS AND ARE APPROXIMATE.
LEGEND
PT PEAT AND OTHER HIGHLY ORGANIC SOILS
SW WELL GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SP POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
SM SILTY SANDS, SAND-SILT MIXTURES
SC CLAYEY SANDS, SAND-CLAY MIXTURES
ML INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY.
OL ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MH INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
CH INORGANIC CLAYS OF FINE PLASTICITY, FAT CLAYS
OH ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
LM WEATHERED LIMESTONE
GM SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
FREE PRODUCT
SOIL SAMPLE INTERVAL
SCREEN INTERVAL
TOC TOP OF CASING ELEVATION IN FEET (MSL)
GROUND WATER ELEVATION AS OF 7/18/95
Richard Catlin & Associates, Inc.
ENVIRONMENTAL ENGINEERS AND HYDROGEOLOGISTS
RC&A
WILMINGTON, NC CHARLESTON, SC ATLANTA, GA MOORESVILLE, NC
PROJECT
BUILDING 1115
LANTDIV NAVFACENGCOM
CAMP LEJEUNE, N.C.
TITLE
CROSS SECTION D-D'
FIGURE
22
JOB NO. 93126ADD
DATE: 1 JUL 95
SCALE 1"=100'
DRAWN BY: WW SB
CHECKED BY: TP

Appendix A -- Re-evaluated Pumping Test Results for RW-1 and RW-2

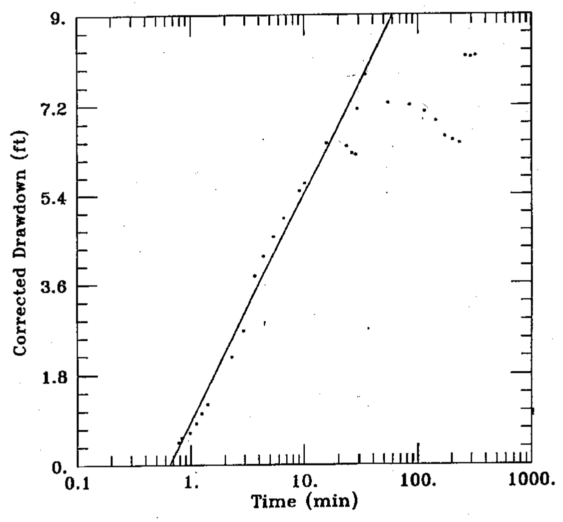
Figure A-1 -- Cooper-Jacob Straight-Line Solution for RW-1 Drawdown Data

Figure A-2 -- Cooper-Jacob Straight-Line Solution for RW-2 Drawdown Data

Figure A-1 -- Cooper-Jacob Straight-Line Solution for RW-1 Drawdown Data

Client: **LANTDIV**	Company: **Baker Environmental, Inc.**
Location: **Site 22 Hadnot Pt. Fuel Farm**	Project: **62470-140**

RW-1 – Site 22 – Hadnot Point Fuel Farm



DATA SET:
RW-1.DAT
05/01/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Cooper-Jacob

PROJECT DATA:
test date: December 15, 1989
test well: RW-1
obs. well: RW-1

TEST DATA:
$Q = 3.$ gal/min
$r = 0.$ ft
$r_c = 0.25$ ft
$r_w = 0.5$ ft
$b = 22.$ ft

PARAMETER ESTIMATES:
$T = 23.08$ ft^2/day
$S = 0.09414$

$K = T/b = 23/22'$

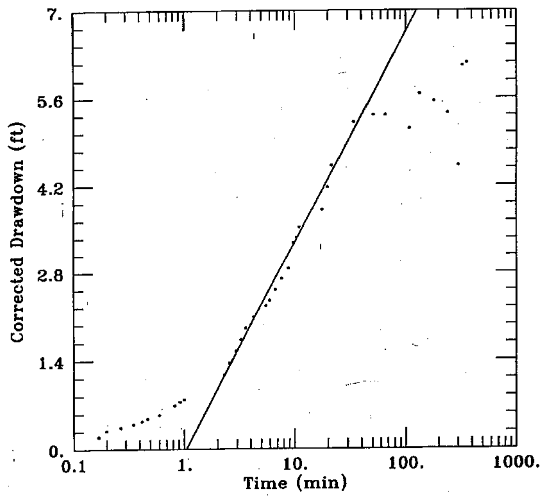
$= 1.0$ ft/day

AQTESOLV

Figure A-2 -- Cooper-Jacob Straight-Line Solution for RW-2 Drawdown Data

Client: **LANTDIV**	Company: **Baker Environmental, Inc.**
Location: **Site 22 Hadnot Pt. Fuel Farm**	Project: **62470-140**

RW-2 - Site 22 - Hadnot Point Fuel Farm



DATA SET:
RW-2.DAT
05/01/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Cooper-Jacob

PROJECT DATA:
test date: December 15, 1989
test well: RW-2
obs. well: RW-2

TEST DATA:
Q = 2. gal/min
r = 0. ft
r_c = 0.25 ft
r_w = 0.5 ft
b = 21. ft

PARAMETER ESTIMATES:
T = 21.02 ft^2/day
S = 0.1367

$K = 21/21' = 1.0$ ft/day
$= T/b$

AQTESOLV

INSTALLATION RESTORATION DIVISION

SUBJ: Building 1101 Update to State

Drafter: NLH 5/8/00

Director: NNP NP 5/8

Deputy: SAB NP 5/8

Comments:

File Location: n|public|120|[illegible] RAL| 1101 info ltr.doc

AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY
(ATSDR)

&

BENZENE

Public Health Assessment for

TO PHOTOCOPY ONLY

Initial Release

U.S. MARINE CORPS CAMP LEJEUNE
JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA
CERCLIS NO. NC6170022580
SEPTEMBER 8, 1994

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

Comments Period Ends

OCTOBER 28, 1994

C. Volatile Organic Compound Exposure (Tap Water)

In the past, the Tarawa Terrace, Hadnot Point, and the Holcomb Boulevard water distribution systems on base were contaminated with high levels of volatile organic compounds (VOCs) see Table 3. The sources of contamination were leaks from off-base and on-base underground tanks, some of which were installed in the 1940s. People who used this water were exposed to VOCs. Exposure was intermittent and stopped when the contaminated wells were closed in 1985. We estimated probable exposure dose levels and concluded that at the estimated exposure levels, we do not expect non-cancerous health effects in adults. Using cancer risk estimates, ATSDR determined that cancerous health effects are unlikely; however, not enough scientific information is available to definitely rule out the possibility of cancerous health effects from low dose exposure to VOCs such as these at MCB Camp Lejeune. There is not enough scientific information on the adverse health effects these compounds might have on children. Additionally, fetuses are potentially more sensitive to VOCs. The base has a relatively young population with many women in their childbearing years and has documented over 1,600 births at the base hospital annually from 1980 to 1985 (22). Studies have shown that there may be an association between low birthweight, late fetal death and exposure to VOCs. Therefore, we recommend that our agency carry out a health study of birth outcomes resulting from exposure to VOCs in drinking water.

What are VOCs?

VOCs make up a group of chemicals having similar physical properties. VOCs readily evaporate or volatilize into gases when exposed to air. Chemicals in this group include trichloroethylene (TCE), dichloroethylene (DCE), benzene, tetrachloroethylene (PCE), methylene chloride, and vinyl chloride and in general may be used as dry cleaning solutions, additives in fuels, or as solvents to dissolve grease or other compounds. The major health concern of VOC exposure is adverse birth outcomes. ATSDR's proposed health study will address this issue.

VOC Sampling

In 1982, MCB Camp Lejeune performed base wide routine sampling of treated drinking water for trihalomethanes (THMs), a procedure to test for chlorine disinfection by-products. In May, the laboratory noted difficulty in measuring THMs in two of the eight water systems in operation at that time because of interference by unidentified compounds. The analysis was then expanded to include trichloroethylene (TCE) and tetrachloroethylene (PCE) which were thought to be the interfering compounds (23).

Hadnot Point Water Distribution System

At Hadnot Point, drinking water samples contained TCE at 1,400 ppb in May 1982, but dropped to 20 ppb in July, 1982 (23). The drop in these levels can be explained by the fact that different supply wells (a few containing contamination and others not) are used on different days. The wells pump water to the distribution system where the water is blended and treated. Chlorine, fluoride, and softeners are added to the water before it is pumped to water towers prior to distribution. The possible sources of contamination at the Hadnot Point distribution system are leaking underground storage tanks containing TCE and fuels, spills during vehicle maintenance operations, and disposal of drums at sites 82, 6, and 9 and associated storage lots in Operable Unit 2 (24, 25).

Additionally, benzene was detected in supply well #602 at 760 ppb. Upon discovering the contamination, MCB Camp Lejeune immediately shut down the supply well #602. Tap water sampling did not show any detectable levels of benzene; therefore, we assume that no one was exposed to benzene after 1982. Although, people could have been exposed to benzene before it was detected at the well, there are no documented reports of benzene levels in tap water. Therefore, in this public health assessment we are not evaluating the likelihood of benzene exposure. In the Hadnot Point system, any given well would have been in use about two-thirds of the time because water demand did not require all wells to be in use at the same time (26).

In July 1984, as part of the Navy Assessment and Control of Installation Pollutants (NACIP) Program, MCB Camp Lejeune conducted water quality sampling in wells on base. They found that eight wells in use at Hadnot Point and one well in use at Tarawa Terrace were contaminated. All nine wells were abandoned and have not been used in the drinking water system since 1985.

Table 3 - Maximum Contaminant Concentrations Detected in On-Base Drinking Water Tap Samples in 1982 - 1985

Chemical	Concentration (ppb)			Drinking Water Standard Established 1991 (ppb)
	Hadnot Point	Tarawa Terrace	Holcomb Blvd	
Trichloroethylene (TCE)	1,400	8	1,148	5
Dichloroethylene (DCE)	407	12	407	7
Tetrachloroethylene (PCE)	ND	215	ND	5
Methylene Chloride	54	ND	ND	5
Vinyl Chloride	3 J†	ND	ND	2

ND - None Detected
J - Estimated Value
† - Detection limit was 10 ppb.

Tarawa Terrace Water Distribution System

Sampling in the Tarawa Terrace water system in May 1982 detected PCE at 80 ppb which remained consistent during the July sampling. No TCE was detected (detection limit 10 ppb). At the time of the 1982 sampling, no source for the contamination at either Hadnot Point or Tarawa Terrace system had been identified (27). Additionally, there were no drinking water standards for these chemicals in 1982; TCE, PCE, and 1,2-DCE levels in drinking water were not regulated until the Safe Drinking Water Act was amended in 1991 (28).

Summary of Site Evaluations (Continued)

Operable Unit	Site Number	Site Name	Contaminated Media[1]					Evaluations
			Ground water	Soil	Surface Water	Sediment	Food Chain	
-	22	Industrial Area Tank Farm	●	NA	NA	NA	NA	This site was included in the original 22 priority sites. A separate investigation of Hadnot Point Industrial Area was conducted. Therefore, this site is not is not included in the Operable Unit Installation Restoration Program. Groundwater contamination (benzene, etc) was detected in base drinking water supply well 602. That well has not been used since 1984. Groundwater contamination at this site contributes to ATSDR's overall concern for potential human health hazards from exposure to contaminated drinking water.
-	45	Campbell Street Underground Fuel Storage Area	●	NA	●	●	NA	This site was included in the original 22 priority sites. Groundwater, surface water, and sediment contamination at this site contribute to ATSDR's overall concern for potential human health hazards. ATSDR is requesting additional information regarding the follow-up activities at this site and the rationale for this site's exclusion from the IRP.
-	68	Rifle Range Dump	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the landfill. Groundwater well monitoring would ensure that this site is not contributing to the base wide groundwater contamination. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
-	75	MCAS Basketball Court Site	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the site. The geophysical survey, did not detect the presence of any buried objects. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
-	76	MCAS Curtis Road Site	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the site. The geophysical survey, did not detect the presence of any buried objects. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
-	A	MCAS (H) Officers' Housing Area	ND	NA	ND	ND	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater or surface water at this site indicating that contamination has not migrated from the site. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.

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Sites 22,45,68,75,76, and A were included in the original 22 priority sites, but are not included in the current Installation Restoration Program.
Sites 78,82,43,86,16,65,7,80,3, and 63 were not originally part of the 22 priority sites, but were subsequently added to the IRP for further investigation.

Public Health Assessment for

For Public Comment

U. S. MARINE CORPS CAMP LEJEUNE
CAMP LEJEUNE, ONSLOW COUNTY, NORTH CAROLINA
EPA FACILITY ID: NC6170022580
JANUARY 6, 1995

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

Comment Period Ends:

FEBRUARY 20, 1995

PUBLIC HEALTH ASSESSMENT

U.S. MARINE CORPS CAMP LEJEUNE

CAMP LEJEUNE, ONSLOW COUNTY, NORTH CAROLINA

CERCLIS NO. NC6170022580

Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Federal Facilities Assessment Branch
Atlanta, Georgia

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment-Public Comment Release was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6), and in accordance with our implementing regulations 42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate. This document represents the Agency's best efforts, based on currently available information, to fulfill the statutory criteria set out in CERCLA section 104 (i)(6) within a limited timeframe. To the extent possible, it presents an assessment of the potential risks to human health. Actions authorized by CERCLA section 104 (i)(11), or otherwise authorized by CERCLA, may be undertaken to prevent or mitigate human exposure or risks to human health. In addition, ATSDR will utilize this document to determine if follow-up health actions are appropriate at this time.

This document has been provided to EPA and the affected state in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. Where necessary, it has been revised in response to comments or additional relevant information provided by them to ATSDR. This revised document has now been released for a 30 day public comment period. Subsequent to the public comment period, ATSDR will address all public comments and revise or append the document as appropriate. The public health assessment will then be reissued. This will conclude the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

Agency for Toxic Substances and Disease Registry	David Satcher, M.D., Ph.D., Administrator Barry L. Johnson, Ph.D., Assistant Administrator
Division of Health Assessment and Consultation	Robert C. Williams, P.E., DEE, Director Juan J. Reyes, Deputy Director
Exposure Investigations and Consultations Branch	Edward J. Skowronski, Acting Chief
Federal Facilities Assessment Branch	Sandra G. Isaacs, Acting Chief
Petitions Response Branch	Cynthia M. Harris, Ph.D., Chief
Superfund Site Assessment Branch	Sharon Williams-Fleetwood, Ph.D., Chief
Program Evaluation, Records, and Information Services Branch	Max M. Howie, Jr., Chief

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Please address comments regarding this report to:

Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Attn: Chief, Program Evaluation, Records, and Information Services Branch, E-56
1600 Clifton Road, N.E., Atlanta, Georgia 30333

C. Volatile Organic Compound Exposure (Tap Water)

In the past, the Tarawa Terrace, Hadnot Point, and Holcomb Boulevard water distribution systems on base were contaminated with volatile organic compounds (VOCs) see Table 3. The sources of contamination were leaks from off-base and on-base underground tanks, some of which were installed in the 1940s. People who used this water were exposed to VOCs. Exposure was intermittent and stopped when the contaminated wells were closed in 1985. From the sampling data, we estimated probable exposure dose levels for adults and concluded that non-cancerous and cancerous health effects are unlikely to occur in those adults exposed. However, not enough scientific information is available to completely rule out the possibility of cancerous health effects from low dose exposure to VOCs such as these at MCB Camp Lejeune. A follow-up cancer evaluation is not being considered by ATSDR at this time because 1) any evidence of excess cancer cases in this small group may be hidden within the rates of cancer for the entire county; 2) the expected delay that occurs between the time of exposure to a carcinogen and the development of cancer is between 10 and 20 years for most cancers, so any individuals exposed to carcinogens in the 1982-1985 timeframe would just now begin to be diagnosed with cancer; and 3) most of the exposed individuals who develop cancer are likely to have moved before they are diagnosed and therefore, not included in the state registry. For children, we could not determine the likelihood of either non-cancerous or cancerous health effects because there is not enough scientific information on the adverse health effects these compounds might have on children. However, there is evidence that because of their developing systems, fetuses are potentially more sensitive to the effects of VOCs than either adults or children. Several epidemiological studies have suggested that there may be associations between exposure to VOCs and birth defects, low birthweight, and late fetal death. Therefore, we recommend that our agency carry out a study of birth outcomes for those women who were exposed to VOCs in drinking water at MCB Camp Lejeune during their pregnancy.

What are VOCs?

VOCs make up a group of chemicals having similar physical properties. VOCs readily evaporate or volatilize into gases when exposed to air. Chemicals in this group include trichloroethylene (TCE), dichloroethylene (DCE), benzene, tetrachloroethylene (PCE), methylene chloride, and vinyl chloride and in general may be used as dry cleaning solutions, additives in fuels, or as solvents to dissolve grease or other compounds. The major health concern of VOC exposure is adverse birth outcomes. ATSDR's proposed health study will address this issue.

VOC Sampling

In 1982, MCB Camp Lejeune performed base wide routine sampling of treated drinking water for trihalomethanes (THMs), a procedure to test for chlorine disinfection by-products. In May 1982, the laboratory noted difficulty in measuring THMs in two of the eight water systems in operation at that time because of interference by unidentified compounds. The analysis was then expanded to include trichloroethylene (TCE) and tetrachloroethylene (PCE) which were thought to be the interfering compounds (37). The findings for each distribution system are summarized below.

Summary of Site Evaluations (Continued)

Operable Unit	Site Number	Site Name	Contaminated Media[1]					Evaluations
			Ground water	Soil	Surface Water	Sediment	Food Chain	
-	22	Industrial Area Tank Farm	●	NA	NA	NA	NA	This site was included in the original 22 priority sites. A separate investigation of Hadnot Point Industrial Area was conducted. Therefore, this site is not is not included in the Operable Unit Installation Restoration Program. Groundwater contamination (benzene, etc) was detected in base drinking water supply well 602. That well has not been used since 1984. Groundwater contamination at this site contributes to ATSDR's overall concern for potential human health hazards from exposure to contaminated drinking water.
-	45	Campbell Street Underground Fuel Storage Area	●	NA	●	●	NA	This site was included in the original 22 priority sites. Groundwater, surface water, and sediment contamination at this site contribute to ATSDR's overall concern for potential human health hazards. ATSDR is requesting additional information regarding the follow-up activities at this site and the rationale for this site's exclusion from the IRP.
-	68	Rifle Range Dump	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the landfill. Groundwater well monitoring would ensure that this site is not contributing to the base wide groundwater contamination. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
-	75	MCAS Basketball Court Site	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the site. The geophysical survey, did not detect the presence of any buried objects. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
-	76	MCAS Curtis Road Site	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the site. The geophysical survey, did not detect the presence of any buried objects. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
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ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

Public Health Assessment for

U.S MARINE CORPS CAMP LEJEUNE MILITARY RESERVATION
CAMP LEJEUNE, ONSLOW COUNTY, NORTH CAROLINA
EPA FACILITY ID: NC6170022580
AUGUST 4, 1997

Summary of Site Evaluations (Continued)

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-	45	Campbell Street Underground Fuel Storage Area	●	NA	●	●	NA	This site was included in the original 22 priority sites. Groundwater, surface water, and sediment contamination at this site is being monitored and tracked under several base programs. contribute to ATSDR's overall concern for potential human health hazards. ATSDR is requesting additional information regarding the follow-up activities at this site and the rationale for this site's exclusion from the IRP.
-	68	Rifle Range Dump	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the landfill. Groundwater well monitoring would ensure that this site is not contributing to the base wide groundwater contamination. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
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24. Agency for Toxic Substances and Disease Registry. ATSDR Record of Activity for telephone communication with Neal Paul, director of Installation Restoration Division, MCB Camp Lejeune. November 21, 1994.

25. Agency for Toxic Substances and Disease Registry. ATSDR Record of Activity for telephone communication with Patrick Watters, State of North Carolina Department of Environment, Health, and Natural Resources. December 8, 1994.

26. Marine Corps Base Camp Lejeune. Letter from Robert L. Warren Assistant Chief of Staff, February 1994.

27. Granger Laboratories. Analyses of samples 206 and 207 from site coded TT and samples 208 and 209 coded HP. Samples received on July 29, 1982. Letter from Bruce Babson, to Commanding General of MCB Camp Lejeune, dated August 10, 1982.

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29. Environmental Science and Engineering, Inc. Characterization step report for Hadnot Point Industrial Area, May 1988.

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34. McKone TE. Human exposure to volatile organic compounds in household tap water: the indoor inhalation pathway. Environ Sci Technol 1987;21:1194-1201.

35. Biomedical and Environmental Information Analysis, Health and Safety Research Division, Oak Ridge National Laboratory. The installation restoration program toxicology guide, volume 1. 1989.

CHARACTERIZATION STEP REPORT FOR HADNOT POINT INDUSTRIAL AREA

CONFIRMATION STUDY TO DETERMINE EXISTENCE AND POSSIBLE MIGRATION OF SPECIFIC CHEMICALS IN SITU

MARINE CORPS BASE
Camp Lejeune, North Carolina

Contract No. N62470-83-C-6106

Prepared for:

NAVAL FACILITIES ENGINEERING COMMAND
Atlantic Division

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida

May 1988

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LIST OF ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/sec	centimeters per second
DPDO	Defense Property Disposal Office
DRMO	Defense Reutilization and Marketing Office
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
ft	feet
ft/day	feet per day
ft^2/day	square feet per day
ft BLS	feet below land surface
ft/ft	feet per foot
gal	gallons
GC	gas chromatograph
GC/MS	gas chromatography/mass spectrometry
gpd/ft	gallons per day per foot
gpm	gallons per minute
gpm/ft	gallons per minute per foot
HPIA	Hadnot Point Industrial Area
IAS	Initial Assessment Study
ID	inside diameter
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
MCL	Maximum Contaminant Level
MDL	method detection limit

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued, 2 of 2)

MEK	methylethylketone
mmHg	millimeters of mercury
NEESA	Naval Energy and Environmental Support Activity
O&G	oil and grease
OD	outside diameter
11DCA	1,1-dichloroethane
12DCA	1,2-dichloroethane
PCB	polychlorinated biphenyl
POL	petroleum, oil, and lubricant
ppb	parts per billion
PVC	polyvinyl chloride
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
T12DCE	trans-1,2-dichloroethene
TCE	trichloroethene
ug/L	microgram per liter
USGS	U.S. Geological Survey
VOC	volatile organic compound

EXECUTIVE SUMMARY

This report presents the findings of the Characterization Step for the Hadnot Point Industrial Area (HPIA) at Camp Lejeune, NC. The Characterization Step is the final field investigative step in the Confirmation Study process which, when completed, will be equivalent to the Remedial Investigation/Feasibility Study (RI/FS) process mandated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA). The Characterization Step was designed to delineate, in a sequential manner, the most likely contaminant source(s) of the volatile organic compounds (VOCs) and other hydrocarbon compounds initially identified during the Verification Step effort at HPIA.

The Verification Step efforts at HPIA identified the presence of VOCs both in the shallow aquifer at Site 22 (Hadnot Point Fuel Tank Farm) and in a single deep water supply well. As a result, Camp Lejeune closed the supply well and initiated investigation of the other water supply wells in the area. Four additional supply wells were found to be contaminated by VOCs and were immediately removed from the system. The Characterization Step effort was initiated to define the extent of the identified contamination and included the following sequential tasks:
(1) a detailed records search throughout the industrial activities within HPIA, (2) soil gas investigations of those areas identified by the records search as potential sources of the observed contamination.
(3) installation and sampling of shallow monitor wells in those areas in which VOC contamination was identified by the soil gas effort,
(4) installation and sampling of intermediate depth and deep monitor wells in those areas in which shallow contamination was identified, and
(5) quantification of aquifer parameters through an aquifer testing program.

RECORDS SEARCH

The records search effort identified the presence of several primary potential sources of the observed contamination. An underground tank formerly utilized for storage of trichloroethene (TCE) was identified adjacent to Bldg. 902 in the northern portion of HPIA. The area around Bldg. 902 was identified as a long-term general vehicle maintenance area, and warranted further investigation. The Base Maintenance Shop (Bldg. 1202), located in the north-central portion of the study area, was also identified as a potential source because of documented VOC storage and usage. Bldg. 1100, also located in the north-central area of HPIA, was identified as a former service station which conducted limited vehicle maintenance. Bldg. 1602, located in the south-central area of HPIA, was identified as a heavy vehicle maintenance facility with a long-term record of VOC storage and usage. In addition, Bldg. 1709 and the surrounding area was documented as a vehicle maintenance area, paint shop, and general maintenance area warranting further investigation.

SOIL GAS INVESTIGATION

Soil gas samples were collected and analyzed from the potential source areas identified by the records search effort. In all cases, VOC contamination was identified in the soil gas, with the highest levels located at Bldg. 1601.

MONITOR WELL INSTALLATION AND SAMPLING

A total of 33 monitor wells were installed at HPIA; 27 shallow wells, 3 intermediate wells, and 3 deep wells. In addition, two shallow monitor wells, previously installed at Confirmation Study Site 22 (Hadnot Point Fuel Farm), and five Camp Lejeune water supply wells (deep aquifer) were sampled. The analytical results indicated that three primary zones of contamination were present at HPIA, centered, respectively, in the vicinity of Bldg. 902, Site 22, and Bldg. 1602. Contaminant isopleth modeling suggested that the contaminant zones centered at Bldg. 902 and Site 22 may have coalesced into a single node of contamination. VOC contamination identified in the soil gas at Bldg. 1202 was not detected in the shallow groundwater. Groundwater flow in the shallow aquifer was identified to the south-southwest.

Intermediate depth (75 ft) and deep (150 ft) monitor wells were installed at the center of the three contaminant zones. Analysis of ground water samples from these wells identified VOC contamination only in the deep monitor wells adjacent to Bldgs. 1202 and 1601. In addition, methylethyl ketone (MEK) was the only VOC detected in these wells, and had not been identified in the shallow ground water.

AQUIFER TESTING

A 72-hour pump test was conducted utilizing Water Supply Well 642, located in the northeast corner of HPIA, to determine the aquifer coefficients for the sand and limestone aquifer which is the source of potable water for Camp Lejeune. These test data were analyzed by a number of analytical techniques to minimize potential bias introduced by a single technique. The results were consistent from method to method, and indicated that the aquifer transmissivity ranged from 6.1×10^3 to 1.3×10^4 gallons per day per foot (gpd/ft) and storage ranged from 5×10^{-4} to 1×10^{-3}. These values are in agreement with the range of values for the sand and limestone aquifer presented in the regional literature.

CONTAMINANT STATUS

The concentration and extent of the contamination in the shallow aquifer has been clearly identified. The concentration and extent of the contamination in the deep aquifer has not been fully described. VOC contamination which resulted in the closure of water supply wells in HPIA was not identified at the source areas identified in the shallow aquifer.

1.0 INTRODUCTION

This report presents the findings of the Characterization Step investigation of the Hadnot Point Industrial Area (HPIA) (Fig. 1-1) conducted as part of the Confirmation Study to Determine the Existence and Possible Migration of Specific Chemicals In Situ. This study is being conducted by Environmental Science and Engineering, Inc. (ESE) under contract (Contract No. N62470-83-C-6106) to Naval Facilities Engineering Command, Atlantic Division (LANTDIV).

The Characterization Step seeks to determine the extent and strength of the contaminant source(s) identified in the Verification Step efforts conducted in the area of Hadnot Point. In addition to extent and strength of observed contamination, the Characterization Step seeks to determine the rate and direction of any potential migration of the measured contamination.

The overall contract to conduct investigative efforts related to the presence and potential migration of contaminants at Camp Lejeune was initiated in 1984. Since that time, and in response to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as well as the Superfund Amendments and Reauthorization Act (SARA) of 1986, the Navy has committed to change the specific terminology of its Confirmation Study program to match that of the U.S. Environmental Protection Agency's (EPA's) Superfund program. The completed Confirmation Study at Camp Lejeune will equal the Remedial Investigation/Feasibility Study (RI/FS) format as mandated by CERCLA/SARA. The current report presents the findings of the RI for the shallow aquifer in HPIA.

For purposes of this report, HPIA is defined as that area delineated by Holcomb Blvd. to the west, Sneads Ferry Rd. to the north, Louis St. to the east, and Main Service Rd. to the south. The utility rights-of-way on either side of these boundary roads are included in the study area, as a number of the monitor wells and water supply wells are located within these utility corridors.

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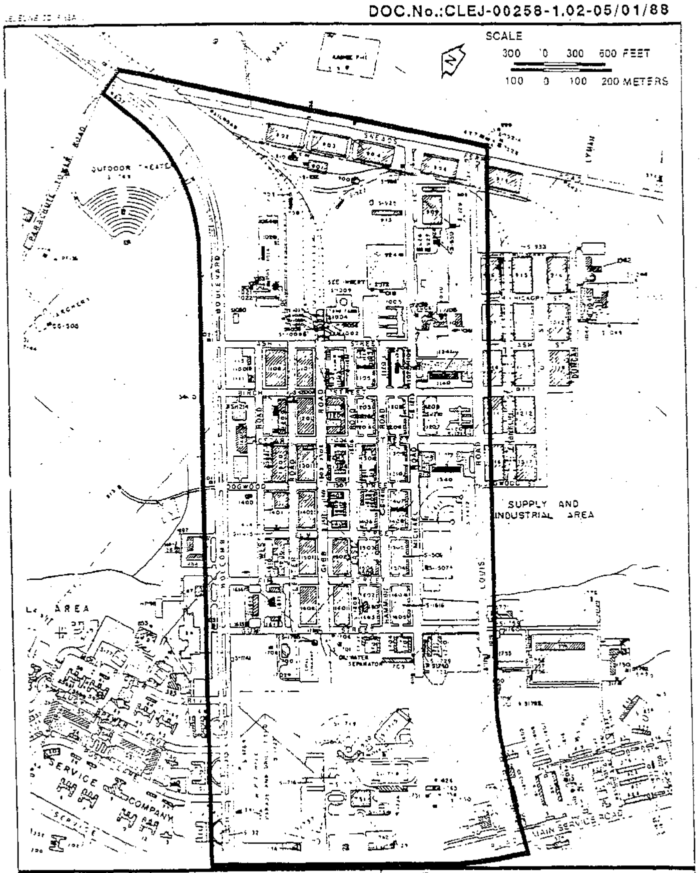

Figure 1-1
HADNOT POINT INDUSTRIAL AREA

SOURCE: Camp Lejeune, 1987.

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2.0 SUMMARY OF VERIFICATION STEP RESULTS

During the period April 1984 to January 1985, geological and groundwater quality investigative efforts were conducted at specific study areas within and adjacent to HPIA, as defined in Sec. 1.0; these areas were identified by the Initial Assessment Study (IAS) [Naval Energy and Environmental Support Activity (NEESA), 1983] as potential sources of contamination.

Several sites of potential contamination, Sites 21, 22, 24, and 28 (Fig. 2-1), identified by IAS are located within or adjacent to HPIA; these sites are under investigation as part of the on-going Verification Step efforts. Site 21 is a potential source of polychlorinated biphenyl (PCB) and pesticide compounds. Sampling completed to date has not identified the presence of volatile organic compounds (VOCs), suggesting that this site is not a source of the VOC contamination identified in the HPIA potable wells. Site 24 has been identified as a potential source of low-level metals contamination only. No VOCs have been detected in the groundwater here, indicating that it is unlikely that this site is a source of the contamination present in the deep aquifer. A range of contaminants has been identified at Site 28, including metals, pesticides, and VOCs. Although the suite of detected VOCs is similar to that detected in the potable wells at HPIA, three factors suggest that Site 28 is not the source of the contamination within the deep aquifer:

1. Non-VOC compounds detected within Site 28 were not detected in the deep aquifer within HPIA;
2. Site 28 is located in a position geohydrologically downgradient of HPIA, with discharge of groundwater to the south of the site; and
3. Measured drawdowns in the deep aquifer within HPIA resulting from pumping of deep wells are not large enough to create a cone of depression at HPIA capable of reversing the natural gradient of the deep aquifer to the south, which would allow contamination from Site 28 to flow northward into HPIA.

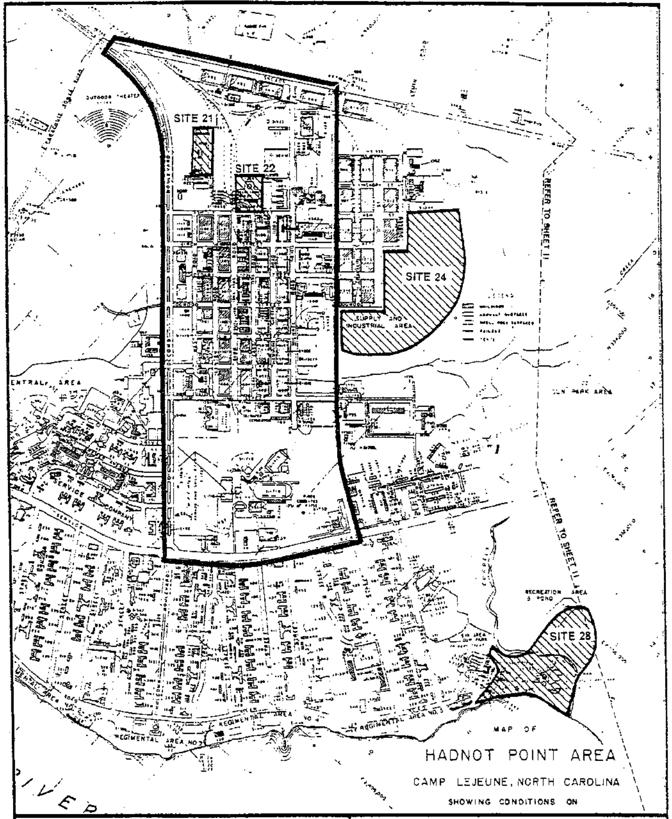

Figure 2-1
OTHER CONFIRMATION STUDY SITES
ADJACENT TO HPIA

SOURCES: CAMP LEJEUNE, 1979; ESE, 1988.

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Site 22 (Fig. 2-2) is the site of documented fuel leaks from the Hadnot Point Fuel Farm. Two Verification Step monitor wells were installed to determine the presence of fuel-derived contamination within the shallow groundwater in the vicinity of the tank farm. In addition to sampling and analysis of groundwater samples from these monitor wells, sampling and analysis of samples from adjacent Water Supply Well 602 was conducted. The samples from Well 22GW1 were found to contain high levels of fuel-derived compounds such as benzene, ethylbenzene, toluene, and lead. Only oil and grease (O&G) was detected in Well 22GW2, indicating that the zone of shallow groundwater contamination did not extend from the tank farm to Well 22GW2, a distance of approximately 500 feet (ft).

Benzene, ethylbenzene, 1,2-dichloroethane (12DCA), trans-1,2-dichloroethene (T12DCE), toluene, and trichlorofluoromethane were detected in deep Water Supply Well 602, located approximately 1,200 ft to the west of the fuel tanks. These data strongly indicated that contamination from the tank leaks was migrating significant distances from the source area via the deep potable aquifer. In addition, the detected VOCs (i.e., non fuel-derived contamination) suggested that other sources of contamination, in addition to those identified by IAS, existed within HPIA. A separate effort is currently underway to identify and recover fuel in the subsurface in the vicinity of the Site 22 fuel tank farm. As a result of the Confirmation Study sampling and analysis, Camp Lejeune initiated a sampling program that included all water supply wells within HPIA. This effort identified contamination by VOCs in eight water supply wells in and adjacent to HPIA. Five of these wells (Fig. 2-3) are located within the defined study area of this report. The five water supply wells have been sampled as part of the Confirmation Study and by Camp Lejeune staff. The results of these efforts, shown in Table 2-1, identified the presence of VOCs in the deep aquifer. The remaining three wells (Fig. 2-4) are located in areas that may not be affected by contaminant sources within the HPIA study area but have been affected by similar VOC contamination. The detected contamination at these three

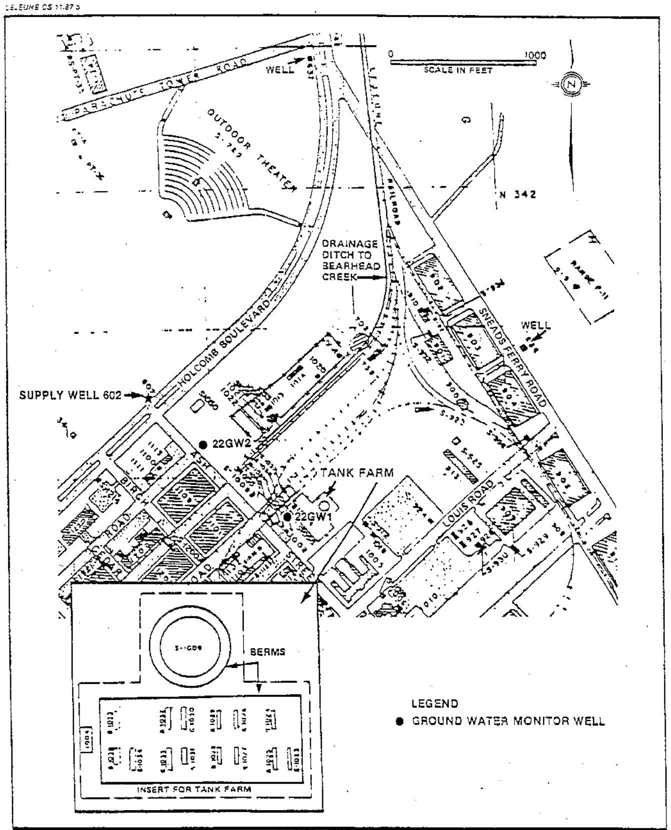

Figure 2-2
HADNOT POINT INDUSTRIAL AREA TANK FARM

SOURCES: Water and Air Research, Inc., 1983.
ESE, 1987.

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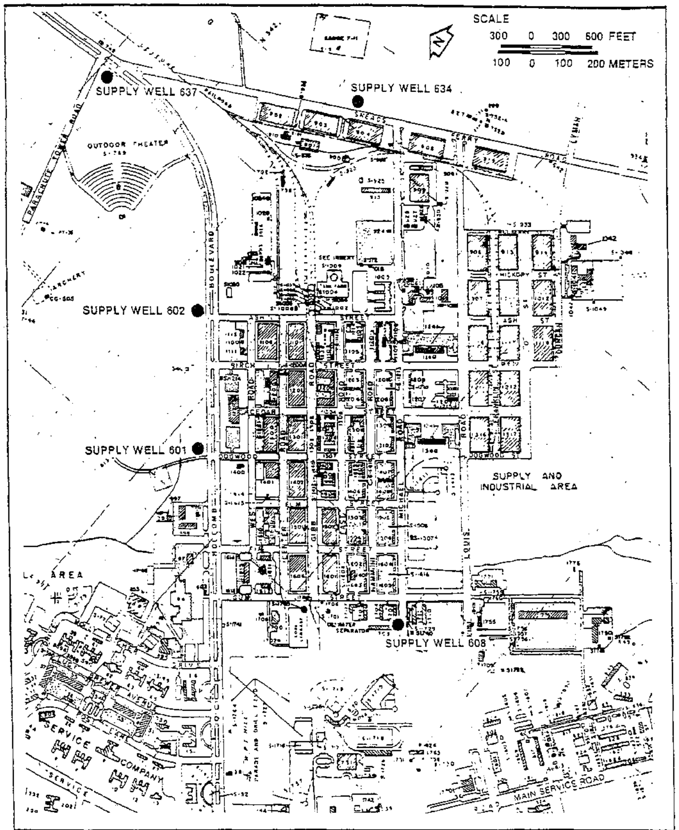

Figure 2-3
SUPPLY WELLS,
HADNOT POINT INDUSTRIAL AREA
SOURCE: Camp Lejeune, 1987.

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Table 2-1. Detected Target Analytes, Potable Wells--Hadnot Point Industrial Area

Parameter (Units)	Concentration by Well Number				
	601	602	608	634	637
Detected in July 1984 Analyzed by ESE					
Benzene (ug/L)	NA	380	NA	NA	NA
1,2-Dichloroethane (ug/L)	NA	46	NA	NA	NA
Trans-1,2-Dichloroethene (ug/L)	NA	7.8	NA	NA	NA
Ethylbenzene (ug/L)	NA	8	NA	NA	NA
Trichlorofluoromethane (ug/L)	NA	3	NA	NA	NA
Toluene (ug/L)	NA	10	NA	NA	NA
Detected on December 5, 1984 Analyzed by JTC Environmental Consultants					
Benzene (ug/L)	--	120	3.7	--	--
Trans-1,2-Dichloroethene (ug/L)	88	630	5.4	--	--
Trichloroethene (ug/L)	210	1,600	110	--	--
Toluene (ug/L)	--	5.4	--	--	--
Tetrachloroethene (ug/L)	5.0	24	--	--	--
Vinyl Chloride (ug/L)	--	18	--	--	--
Detected on December 12, 1984 Analyzed by JTC Environmental Consultants					
Benzene (ug/L)	--	720	4.0	--	--
Trans-1,2-Dichloroethene (ug/L)	99	380	2.4	2.3	--
Trichloroethene (ug/L)	230	540	13	--	--
Tetrachloroethene (ug/L)	4.4	--	--	--	--
Methylene Chloride (ug/L)	10	--	14	130	--

Table 2-1. Detected Target Analytes, Potable Wells--Hadnot Point Industrial Area (Continued, Page 2 of 3)

Parameter (Units)	Concentration by Well Number				
	601	602	608	634	637
Detected on December 19, 1984 Analyzed by JTC Environmental Consultants					
Benzene (ug/L)	NA	230	NA	NA	NA
Trans-1,2-Dichloroethene (ug/L)	NA	230	NA	NA	NA
Trichloroethene (ug/L)	NA	340	NA	NA	NA
Toluene (ug/L)	NA	12	NA	NA	NA
Detected in January 1985 Analyzed by JTC Environmental Consultants					
1,2-Trans-dichloroethene (ug/L)	8.8	NA	NA	700	--
Trichloroethene (ug/L)	26	NA	NA	1,300	--
Tetrachloroethene (ug/L)	--	NA	NA	10	--
Detected in November 1986 Analyzed by ESE					
Barium, Total (ug/L)	21.8	31.3	43.4	18.5	NA
Nitrogen, $NO_2 + NO_3$ (as N) (mg/L)	0.042	--	--	--	NA
Nitrogen, NO_2 (as N) (mg/L)	0.042	--	--	--	NA
Iron, Total (ug/L)	12,800	15,200	3,600	2,830	NA
Chloride (mg/L)	68.3	23.0	9.5	7.9	NA
Manganese, Total (ug/L)	97.6	134	67.8	19.5	NA
Sodium, Total (mg/L)	9.25	12.3	6.53	5.48	NA
Sulfate (mg/L)	5,170	92	12	--	NA
Color, True (PCU)	104	48	9	10	NA

Table 2-1. Detected Target Analytes, Potable Wells--Hadnot Point Industrial Area (Continued, Page 3 of 3)

Parameter (Units)	Concentration by Well Number				
	601	602	608	634	637
Detected in November 1986 Analyzed by ESE (Continued)					
Residue, Diss (mg/L)	358	524	270	226	NA
Turbidity (FTU/NTU)	17.0	18.0	10.0	11.0	NA
Chromium, Total (ug/L)	7.7	14.1	6.8	6.1	NA
Copper, Total (ug/L)	10.4	556	574	21.7	NA
Mercury, Total (ug/L)	0.6	0.5	0.7	0.6	NA
Zinc, Total (ug/L)	3,200	93.8	99.1	17.2	NA
Benzene (ug/L)	--	50	--	--	NA
1,2-Dichloroethane (ug/L)	--	9.2	--	--	NA
Trans-1,2-Dichloroethene (ug/L)	--	14	8.5	2.9	NA
Trichloroethene (ug/L)	--	2.2	66	--	NA
Bis(2-Ethylhexyl) Phthalate (ug/L)	1.3	--	--	--	NA

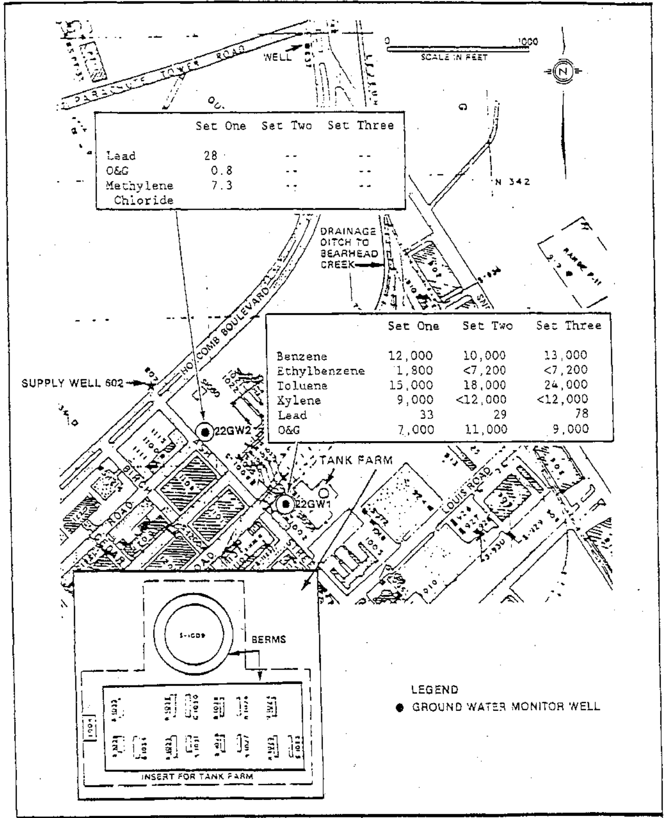
Note:
ug/L = micrograms per liter.
mg/L = miiligrams per liter.
FTU/NTU = formazin turbidity unit and nephelometric turbidity unit.
NA = not analyzed.
PCU = platinum-cobalt units.
-- = below detection limits.

Source: ESE, 1988.

4.4.1.1 Hadnot Point Fuel Tank Farm (Site 22)
In the Set One data (Fig. 4-30), Well 22GW1, located next to the fuel tanks, was found to contain elevated levels of O&G, benzene, ethylbenzene, toluene, and xylene. All of these compounds are related to documented fuel leaks at the facility. Well 22GW2, located to the west of the facility, was found to contain only O&G and methylene chloride, suggesting that the contaminant plume in the shallow aquifer does not extend from the tanks to this well site. The levels of lead in the Set One data for 22GW1 were above the method detection limit (MDL), but below the Maximum Contaminant Level (MCL) of 50 micrograms per liter (mg/L).

Well 22GW1 was found to contain elevated levels of benzene, toluene, and O&G in the Set Two sampling effort. The levels are similar to those in the Set One data; however, the Set One data had also identified elevated levels of ethylbenzene and xylene. It is probable that these compounds were present in the Set Two samples, but the dilution required to quantify the largest peak in the chromatograph (toluene) reduced several other peaks to less than the post-dilution detection limit. The level of lead in the Set Two data is not of concern. No target analytes were identified in the Set Two data from Well 22GW2, located to the west of the facility.

In the Set Three data, Well 22GW1 was found to contain elevated levels of benzene, toluene, lead, and O&G. The levels of VOCs are generally similar to those in the Set One and Set Two data; however, the Set One data had identified elevated levels of ethylbenzene and xylene. As described for the Set Two data, it is probable that these compounds were present in the Set Three samples, but the dilution required to quantify the largest peak in the chromatograph (toluene) reduced several other peaks to less than the post-dilution detection limit. The levels of lead in both the Set One and Set Two data were not of concern; lead concentration in the Set Three data (78 ug/L) is greater than the MCL of 50 ug/L. Set Three samples from Well 22GW2 did not contain detectable quantities of any of the target analytes. Batch-specific analytical



	Set One	Set Two	Set Three
Lead	28	--	--
O&G	0.8	--	--
Methylene Chloride	7.3	--	--

	Set One	Set Two	Set Three
Benzene	12,000	10,000	13,000
Ethylbenzene	1,800	<7,200	<7,200
Toluene	15,000	18,000	24,000
Xylene	9,000	<12,000	<12,000
Lead	33	29	78
O&G	7,000	11,000	9,000

Figure 4-30
CONTAMINANT DISTRIBUTION (ug/L) —
HADNOT POINT INDUSTRIAL AREA TANK FARM
SOURCES. Water and Air Research, Inc., 1983.
ESE, 1987.

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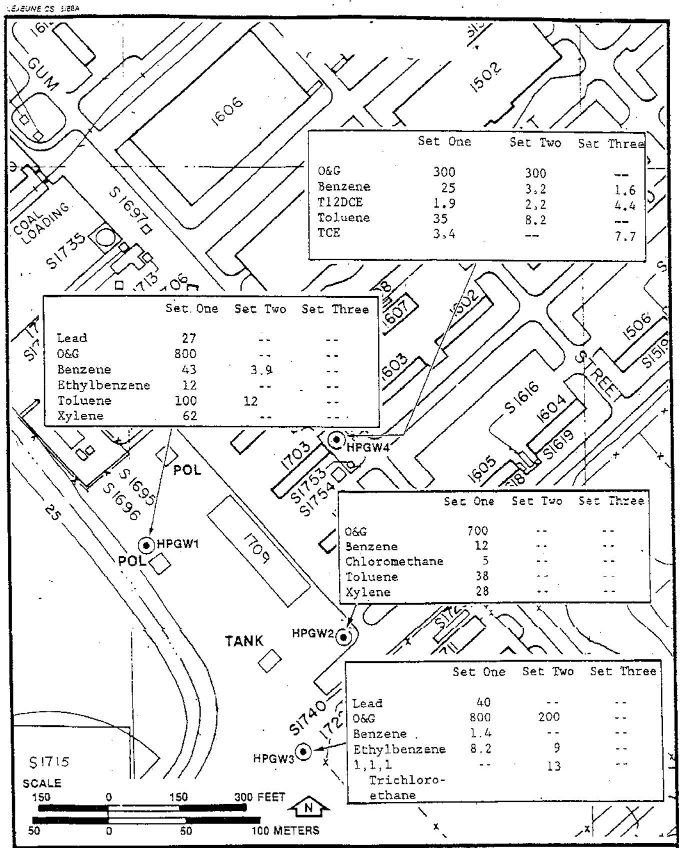
conditions resulted in an MDL of 49.2 ug/L for lead in the Set Three samples. This MDL is higher than for previous data sets, but is still less than the MCL.

4.4.1.2 Bldgs. 1709 and 1710

The soil gas data for this area, presented in Sec. 4.2, showed an area of maximum TCE contamination in the vicinity of well HPGW1 (see Fig. 4-31). TCE was not detected in the vicinity of wells HPGW2 through HPGW4 during the soil gas investigation; however, other unidentified compounds were present which caused the detection limit for TCE to increase because of the required dilution of the samples prior to analysis. TCE was, however, detected only in the Set One water samples from HPGW4 (3.4 ug/L), suggesting that the TCE detected in the soil gas near HPGW1 may be present in the soil matrix only. Additionally, the TCE in HPGW4 may be related to Bldg. 1601. Trace levels of two additional solvent compounds were detected in two other wells (5.0 ug/L chloromethane--HPGW2, 1.9 ug/L T12DCE--HPGW4) in this area. The compounds which caused interference with the detection of TCE in the soil gas appear to be related to spills and/or leaks of fuels. O&G, benzene, ethylbenzene, toluene, and xylene were detected in most of the four wells in this area. Well HPGW2 is located immediately adjacent to Water Supply Well 608 (closed) and suggests that the contaminants detected in Water Supply Well 608 (TCE and T12DCE) are not from contamination of the shallow aquifer in the vicinity of the well.

The suite of detected VOCs in the Set Two data were similar to those detected in the Set One data. In most cases, however, the Set Two levels were lower than the Set One levels. Lead concentrations in both data sets are not of concern. None of the detected analytes in the Set Two data were above applicable action limits; however, this is not a permanent condition, as the Set One data indicate that benzene in wells HPGW1, HPGW2, and HPGW4 periodically exceeds the MCL of 5 ug/L and chloromethane in HPGW2 periodically exceeds the Water Quality Criterion, adjusted for drinking water only, of 0.19 ug/L (10^{-6} risk level).



	Set One	Set Two	Set Three
O&G	300	300	--
Benzene	25	3.2	1.6
T12DCE	1.9	2.2	4.4
Toluene	35	8.2	--
TCE	3.4	--	7.7

	Set One	Set Two	Set Three
Lead	27	--	--
O&G	800	--	--
Benzene	43	3.9	--
Ethylbenzene	12	--	--
Toluene	100	12	--
Xylene	62	--	--

	Set One	Set Two	Set Three
O&G	700	--	--
Benzene	12	--	--
Chloromethane	5	--	--
Toluene	38	--	--
Xylene	28	--	--

	Set One	Set Two	Set Three
Lead	40	--	--
O&G	800	200	--
Benzene	1.4	--	--
Ethylbenzene	8.2	9	--
1,1,1 Trichloro-ethane	--	13	--

Figure 4-31
CONTAMINANT DISTRIBUTION (ug/L) — BLDGS. 1709 AND 1710

SOURCE: ESE, 1987.

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The distribution of contamination by VOCs at this site as indicated by the Set Three data was decreased relative to the Set Two data. VOCs were detected only in Well HPGW4. The levels of specific VOCs in this well have changed in an erratic fashion; benzene and toluene have decreased relative to Set Two, whereas T12DCE and TCE have increased. In addition, an unknown compound similar to methylethylketone (MEK) was detected for the first time. Of the detected analytes in the Set Three data, only TCE is above the applicable water quality standard/guideline (proposed MCL of 5 ug/L). However, this is not a permanent condition, as the Set One data indicate that several other compounds periodically exceed the applicable standards/guidelines.

4.4.1.3 Bldg. 1613 (Exchange Service Station)

Three wells (HPGW5 through HPGW7) were installed around the station (Fig. 4-32) to monitor for the possibility of fuel leaks. O&G was the only target analyte detected in these wells, suggesting the station has released waste O&G from maintenance operations but that fuel leaks do not appear to have occurred.

Set Two data from wells HPGW5 through HPGW7 suggest that some petroleum hydrocarbons are present in the shallow groundwater, but that fuel leaks have not occurred. Lead concentration in both the Set One and Set Two data are not of concern.

No target analytes were detected in the Set Three data. This may be attributed to changes in groundwater levels as summer (i.e., dry season) conditions became prevalent at the site.

4.4.1.4 Bldgs. 1502, 1601, and 1602

During the soil gas investigation, very high levels of TCE were detected between Bldgs. 1502 and 1601, with lower levels detected between Bldgs. 1601 and 1602 (Sec. 4.2). As a result, four shallow monitor wells were installed (HPGW8 through 11) to characterize the groundwater quality

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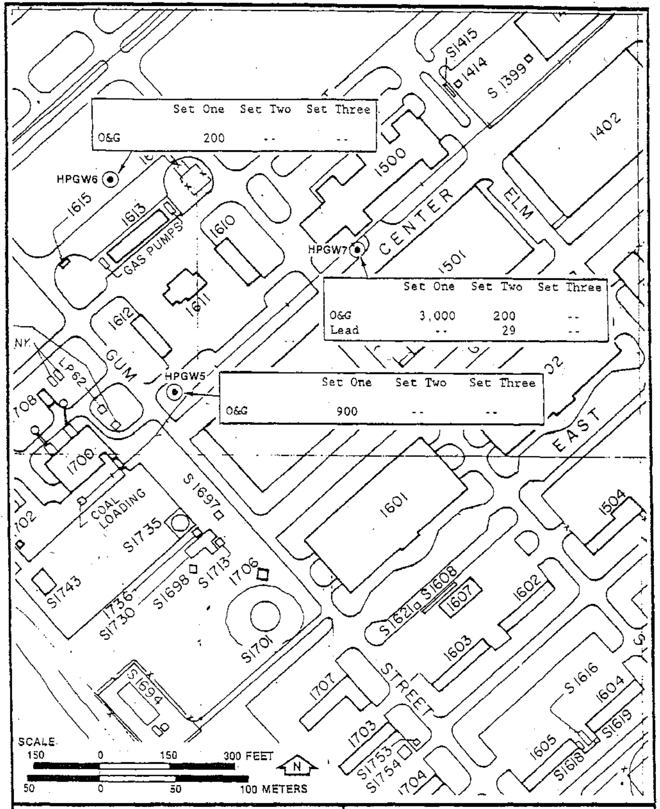

HPGW6

	Set One	Set Two	Set Three
O&G	200	--	--

HPGW7

	Set One	Set Two	Set Three
O&G	3,000	200	--
Lead	--	29	--

HPGW5

	Set One	Set Two	Set Three
O&G	900	--	--

Figure 4-32
CONTAMINANT DISTRIBUTION (ug/L) —
BLDG. 1613

SOURCE: ESE, 1987.

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MARINE CORPS BASE
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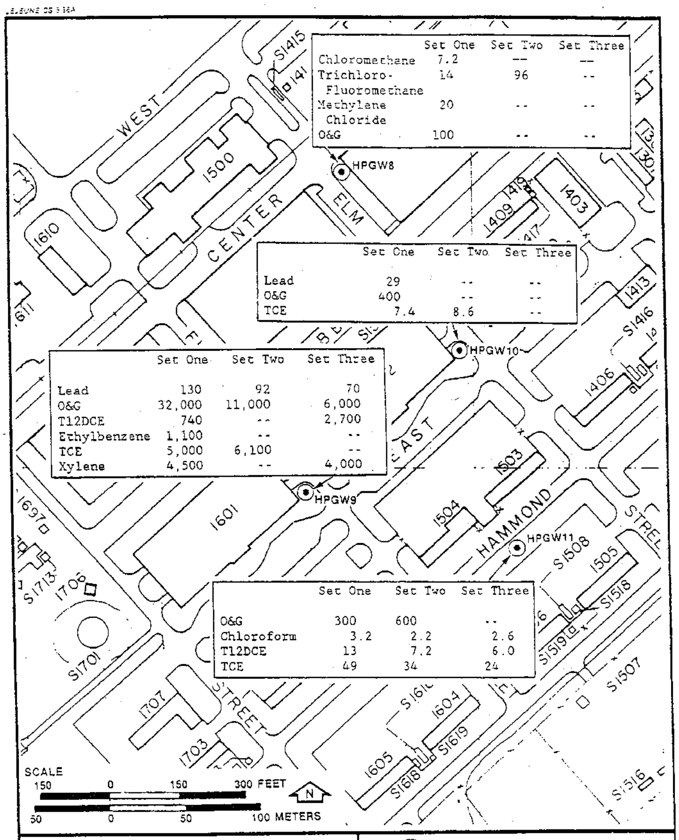
(Fig. 4-33). Well HPGW9, located at the center of the soil gas high, was found to contain high levels of O&G, T12DCE, ethylbenzene, TCE, and xylene in the Set One data. This suite of detected contaminants is consistent with the usage of this area as a vehicle maintenance facility. The remaining wells in this area were found to contain a similar suite of contaminants, although at lesser concentrations and with a somewhat sporadic distribution. In addition, levels of other volatile compounds such as chloroform, chloromethane, methylene chloride, and trichlorofluoromethane were detected on a sporadic basis in the other wells in this area.

The Set One data indicated a sporadic distribution of VOCs in this area. This pattern was verified by the Set Two data, with some variations attributable to time variation of chemical character. Well HPGW9, in the center of the soil gas hot spot, continued to be the most highly contaminated, with elevated levels of lead, O&G, and TCE. Other VOCs detected in Set One may have been present in Set Two, but were obscured by the strength of the TCE peak. The level of trichlorofluoromethane at well HPGW8 had increased with time, suggesting that pumping of the well during the presample purging was drawing a nearby zone of contamination toward the well. In both data sets, the concentration of lead at HPGW9 is greater than the MCL.

The Set One and Set Two data had indicated a sporadic distribution of VOCs in this area. With the Set Three data, a pattern may be delineated. Well HPGW9, in the center of the soil gas hot spot, was consistently the most highly contaminated, with elevated levels of lead, O&G, and VOCs. The specific VOCs present in each data set from this well varies, with T12DCE, and xylene present in the Set Three data. The levels of T12DCE and xylene are greater than the proposed recommended MCLs of 70 ug/L and 440 ug/L, respectively. Other VOCs detected in previous data sets may be present in Set Three, but were obscured by the strength of the T12DCE and xylene peaks. Of significance in the Set Three data was the lack of high-level contamination by TCE which was noted in the previous sets.



HPGW8:

	Set One	Set Two	Set Three
Chloromethane	7.2	--	--
Trichloro-Fluoromethane	14	96	--
Methylene Chloride	20	--	--
O&G	100	--	--

HPGW10:

	Set One	Set Two	Set Three
Lead	29	--	--
O&G	400	--	--
TCE	7.4	8.6	--

HPGW9:

	Set One	Set Two	Set Three
Lead	130	92	70
O&G	32,000	11,000	6,000
T12DCE	740	--	2,700
Ethylbenzene	1,100	--	--
TCE	5,000	6,100	--
Xylene	4,500	--	4,000

HPGW11:

	Set One	Set Two	Set Three
O&G	300	600	--
Chloroform	3.2	2.2	2.6
T12DCE	13	7.2	6.0
TCE	49	34	24

Figure 4-33
CONTAMINANT DISTRIBUTION (ug/L) —
BLDGS. 1502, 1601, AND 1602

SOURCE: ESE, 1987.

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The second most highly contaminated well was HPGW11. This well was the only one in Set Three to contain detectable quantities of TCE. The detected level of TCE is greater than the proposed MCL of 5 ug/L. Chloroform and T12DCE were detected at levels below the applicable action limits. No target analytes were detected in HPGW8 and HPGW10 in Set Three; these wells had previously contained sporadic low-level contamination by VOCs and O&G.

4.4.1.5 Bldg. 1202

The soil gas investigation identified the presence of high levels of TCE in the vicinity of Bldg. 1202, the Base Maintenance Shop. Four wells (HPGW15 through HPGW18) (Fig. 4-6) were installed to determine the extent of the groundwater contamination associated with the contamination in the soils. One target analyte (O&G) was detected in only one well (HPGW16) in the Set One data. In light of the soil gas data, these results were surprising. The TCE detected in the soil appears to be contained in the soil, possibly aided by the fact that most of the area around Bldg. 1202 is paved, preventing infiltration of rainfall and subsequent transport of TCE into the shallow groundwater. In addition, the soil gas has not been allowed to discharge to the atmosphere, possibly resulting in a concentration of organic vapors just below the pavement.

As in the Set One data, no VOCs were detected in wells HPGW15 through HPGW18 in the Set Two data. O&G and lead were the only two target analytes detected in the samples. The levels of O&G in the Set Two data may be greater than the organoleptic threshold. The lead concentrations were below the MCL in the Set One data, but were close to the MCL at wells HPGW15 and HPGW16 in the Set One data.

The two previous data sets did not identify the presence of any VOCs in the wells (HPGW15 through HPGW18) installed in the vicinity of this building. The Set Three data detected trichlorofluoromethane in Well HPGW15. O&G and lead were not detected in Set Three; both analytes had been detected in Set One and Set Two. Although lead was not detected in the Set Three data, the MDL was greater than the concentrations detected in previous samples, but less than the MCL.

4.4.1.6 Bldg. 1100

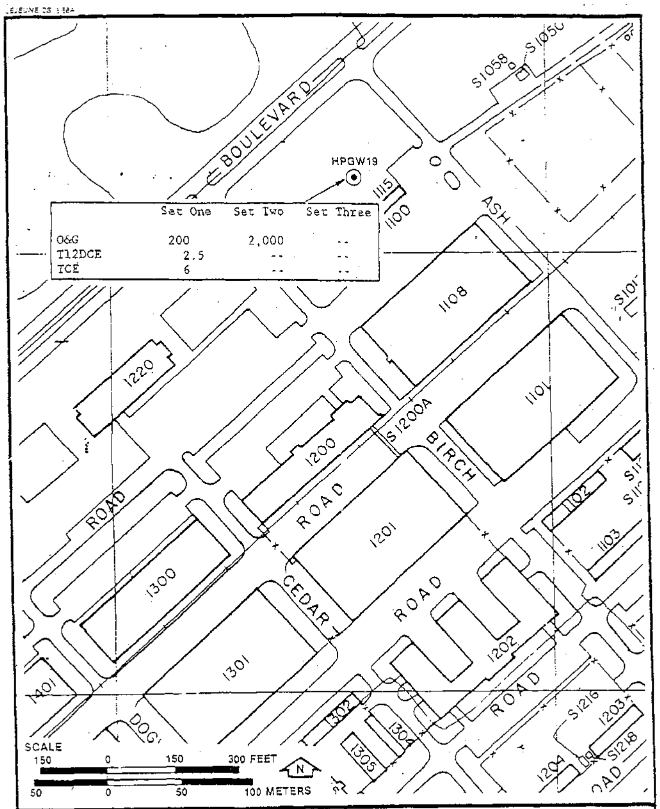
TCE was detected in this area during the soil gas investigation (Sec. 4.2). A single monitor well (HPGW19) was installed to sample and analyze the groundwater (Fig. 4-34). O&G, T12DCE, and TCE were detected in this well in the Set One data, consistent with past usage of this area as a service station conducting limited amounts of vehicle maintenance.

The detectable contamination at well HPGW19 was limited to O&G in the Set Two data. The low levels of T12DCE and TCE detected in the Set One data were reduced to less than the MDL at the time of the Set Two sampling.

No contamination was detected at well HPGW19 in the Set Three data. Previously, low levels of T12DCE and TCE (Set One) and O&G (Set Two) had been detected at this well. Physical conditions at the site, such as low rainfall, may have reduced contaminant levels to less than the MDL at the time of the Set Three sampling. This has been noted at several other monitor wells in HPIA.

4.4.1.7 Bldgs. 901, 902, and 913

Four wells (HPGW22 through HPGW25) were installed in the vicinity of Bldg. 901 (Fig. 4-35). The location of a TCE storage tank next to the building was identified during the records review; the area surrounded by the four wells was previously utilized for maintenance of heavy equipment. The soil gas investigation detected TCE in a single data point each at both Bldgs. 901 and 902. In the Set One data, all monitor wells detected O&G; T12DCE and TCE were detected in HPGW23 and HPGW24; and vinyl chloride, 1,1-dichloroethane (11DCA), and benzene were detected in HPGW24. These detected analytes are consistent with the use of TCE and the maintenance of equipment documented to have occurred in this area.

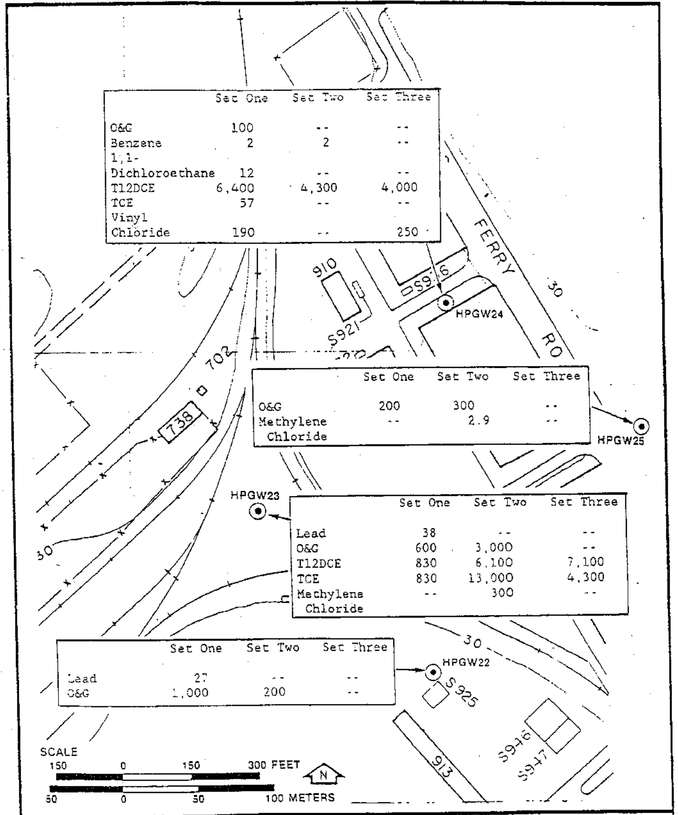


	Set One	Set Two	Set Three
O&G	200	2,000	--
T12DCE	2.5	--	--
TCE	6	--	--

Figure 4-34
CONTAMINANT DISTRIBUTION (ug/L) —
BLDG. 1100

SOURCE: ESE. 1987.

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE



	Set One	Set Two	Set Three
O&G	100	--	--
Benzene	2	2	--
1,1-Dichloroethane	12	--	--
T12DCE	6,400	4,300	4,000
TCE	57	--	--
Vinyl Chloride	190	--	250

	Set One	Set Two	Set Three
O&G	200	300	--
Methylene Chloride	--	2.9	--

	Set One	Set Two	Set Three
Lead	38	--	--
O&G	600	3,000	--
T12DCE	830	6,100	7,100
TCE	830	13,000	4,300
Methylene Chloride	--	300	--

	Set One	Set Two	Set Three
Lead	27	--	--
O&G	1,000	200	--

Figure 4-35
CONTAMINANT DISTRIBUTION (ug/L) —
BLDGS. 901, 902, AND 903

SOURCE: ESE, 1987.

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

In the Set Two data, all wells were found to contain O&G at levels estimated (because of a prominent odor) to be greater than the organoleptic limit. Very high levels of T12DCE and TCE were identified in HPGW23 and HPGW24; these levels are greater than those detected in Set One, suggesting that the pre-sampling pumping of these wells was drawing a nearby zone of high contamination toward the wells. Methylene chloride was detected in HPGW23 and HPGW25 for the first time in the Set Two data. It is possible that other VOCs, at low levels, may be present in some of the samples but the required pre-analysis dilutions could have rendered them undetectable. The concentrations of lead detected by either data set are not of concern.

High levels of T12DCE and TCE were identified in Well HPGW23 in the Set Three data; these levels are less than those detected in Set Two, suggesting that migration of contamination toward the well as the result of presampling pumping has stabilized. TCE was detected in Well HPGW23 at a level less than half that for the Set Two samples. Vinyl chloride was detected in HPGW24, as it had been in the Set One samples. This target analyte was less than the MDL in the Set Two data. The required pre-analysis dilutions may have rendered other VOCs undetectable.

4.4.1.8 Well Pairs with Water Supply Wells

A shallow monitor well was installed next to each of five closed water supply wells in HPIA (Fig. 4-36). In the Set One data, Well HPGW2 (paired with Supply Well 608) was found to contain O&G, benzene, chloromethane, toluene, and xylene. This contamination identified in the shallow aquifer appears to be derived from waste fuel, whereas Supply Well 608 has been found to contain solvent-based VOCs. It appears that the two aquifer zones at this well pair are not well connected hydraulically because the types of contamination are dissimilar. The deep contamination may have migrated to the supply wells via flow in the deeper aquifer, augmented by the drawdown in the deep aquifer caused by the wells when they were active. An alternative transport mechanism is that the solvent-derived VOCs observed in the deeper aquifer have

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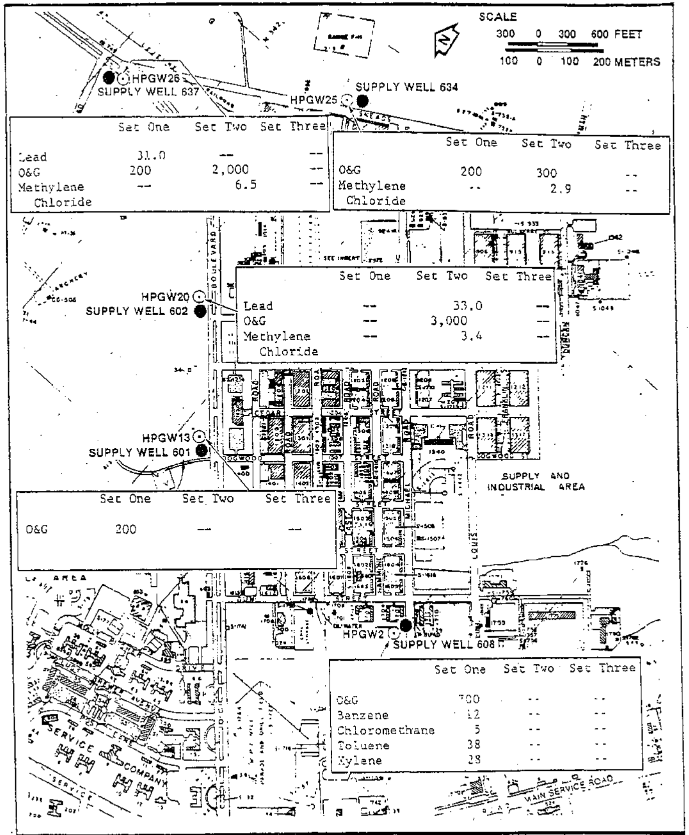

	Set One	Set Two	Set Three
Lead	31.0	--	--
O&G	200	2,000	--
Methylene Chloride	--	6.5	--

	Set One	Set Two	Set Three
O&G	200	300	--
Methylene Chloride	--	2.9	--

	Set One	Set Two	Set Three
Lead	--	33.0	--
O&G	--	3,000	--
Methylene Chloride	--	3.4	--

	Set One	Set Two	Set Three
O&G	200	--	--

	Set One	Set Two	Set Three
O&G	700	--	--
Benzene	12	--	--
Chloromethane	5	--	--
Toluene	38	--	--
Xylene	28	--	--

Figure 4-36
CONTAMINANT DISTRIBUTION — WELL PAIRS WITH WATER SUPPLY WELLS

SOURCE: Camp Lejeune, 1987.

CONFIRMATION STUDY
MARINE CORPS BASE
CAMP LEJEUNE

Doc No: CLEJ-00258-1.02-05/01/88

ENVIRONMENTAL SCIENCE & ENGINEERING 12/01/87 STATUS: FINAL PAGE# 1

PROJECT NUMBER 86447 0400 PROJECT NAME NAVY - LEJEUNE
FIELD GROUP LJHP-1 LAB COORDINATOR J.D. SHAMIS

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	22GW1 LJHP-1 1	22GW2 LJHP-1 2	HPGW1 LJHP-1 3	HPGW2 LJHP-1 4	HPGW3 LJHP-1 5	HPGW4 LJHP-1 6	HPGW5 LJHP-1 7	HPGW6 LJHP-1 8	HPGW7 LJHP-1 9	HPGW8 LJHP-1 10	HPGW9 LJHP-1 11	HPGW10 LJHP-1 12	HPGW11 LJHP-1 13	HPGW12 LJHP-1 14	HPGW13 LJHP-1 15
DATE		01/09/87	01/09/87	01/09/87	01/09/87	01/09/87	01/12/87	01/12/87	01/12/87	01/12/87	01/13/87	01/14/87	01/14/87	01/14/87	01/14/87	01/14/87
TIME		11:02	10:05	12:05	13:20	14:25	10:00	12:05	14:08	16:40	14:55	10:25	11:45	12:55	13:59	15:55
LEAD, TOTAL UG/L	1051 ICAP	33.0	28.0	27.0	<27.0	40.0	29.0	<27.0	<27.0	<27.0	<27.0	130	29.0	<27.0	<27.0	<27.0
OIL&GR, IR MG/L	560 1	7	0.8	0.7	0.7	0.8	0.3	0.9	0.2	3	0.1	32	0.4	0.3	0.2	0.2
BENZENE UG/L	34030 GMS	12000	<1.0	43	12	1.4	25	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<1.0	<1.0	<1.0
BROMODICHLOROMETHANE UG/L	32101 GMS	<22	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<220	<2.2	<2.2	<2.2	<2.2
BROMOFORM UG/L	32104 GMS	<47	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<470	<4.7	<4.7	<4.7	<4.7
BROMOMETHANE UG/L	34413 GMS	<58	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<580	<5.8	<5.8	<5.8	<5.8
CARBON TETRACHLORIDE UG/L	32102 GMS	<28	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<280	<2.8	<2.8	<2.8	<2.8
CHLOROBENZENE UG/L	34301 GMS	<60	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<600	<6.0	<6.0	<6.0	<6.0
CHLOROETHANE UG/L	34311 GMS	<82	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<820	<8.2	<8.2	<8.2	<8.2
2-CHLOROETHYLVINYL ETHER UG/L	34576 GMS	<150	<26	<15	<15	<15	<15	<15	<15	<15	<15	<1500	<15	<15	<15	<15
CHLOROFORM UG/L	32106 GMS	<16	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<160	<1.6	3.2	<1.6	<1.6
CHLOROMETHANE UG/L	34418 GMS	<43	<4.3	<4.3	5.0	<4.3	<4.3	<4.3	<4.3	<4.3	7.2	<430	<4.3	<4.3	<4.3	<4.3
DIBROMOCHLOROMETHANE UG/L	32105 GMS	<31	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<310	<3.1	<3.1	<3.1	<3.1
1,1-DICHLOROETHANE UG/L	34496 GMS	<47	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<470	<4.7	<4.7	<4.7	<4.7
1,2-DICHLOROETHANE UG/L	34531 GMS	<28	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<280	<2.8	<2.8	<2.8	<2.8
1,1-DICHLOROETHYLENE UG/L	34501 GMS	<28	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<280	<2.8	<2.8	<2.8	<2.8
TRANS-1,2-DICHLOROETHENE UG/L	34546 GMS	<16	<1.6	<1.6	<1.6	<1.6	1.9	<1.6	<1.6	<1.6	<1.6	740	<1.6	13	<1.6	<1.6
1,2-DICHLOROPROPANE UG/L	34541 GMS	<60	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<600	<6.0	<6.0	<6.0	<6.0
CIS-1,3-DICHLOROPROPENE UG/L	34704 GMS	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<500	<5.0	<5.0	<5.0	<5.0
TRANS-1,3-DICHLOROPROPENE UG/L	34699 GMS	<64	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<640	<6.4	<6.4	<6.4	<6.4

DOC NO: CLEJ-00258-1.02-05/01/88

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PROJECT NUMBER 86447 U400 PROJECT NAME NAVY - LEJEUNE
FIELD GROUP, LJHP-I LAB COORDINATOR J.D. SHAMIS

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	22GW1 LJHP-I 1	22GW2 LJHP-I 2	HPGW1 LJHP-I 3	HPGW2 LJHP-I 4	HPGW3 LJHP-I 5	HPGW4 LJHP-I 6	HPGW5 LJHP-I 7	HPGW6 LJHP-I 8	HPGW7 LJHP-I 9	HPGW8 LJHP-I 10	HPGW9 LJHP-I 11	HPGW10 LJHP-I 12	HPGW11 LJHP-I 13	HPGW12 LJHP-I 14	HPGW13 LJHP-I 15
DATE TIME		01/09/87 11:02	01/09/87 10:05	01/09/87 12:05	01/09/87 13:20	01/09/87 14:25	01/12/87 10:00	01/12/87 12:05	01/12/87 14:08	01/12/87 16:40	01/13/87 14:55	01/14/87 10:25	01/14/87 11:45	01/14/87 12:55	01/14/87 13:59	01/14/87 15:55
ETHYLBENZENE UG/L	34371 GMS	1800	<7.2	12	<7.2	8.2	<7.2	<7.2	<7.2	<7.2	<7.2	1100	<7.2	<7.2	<7.2	<7.2
METHYLENE CHLORIDE UG/L	34423 GMS	<28	7.3	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	20	<280	<2.8	<2.8	<2.8	<2.8
1,1,2,2-TETRACHLORO ETHANE UG/L	34516 GMS	<41	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<410	<4.1	<4.1	<4.1	<4.1
TETRACHLOROETHENE UG/L	34475 GMS	<30	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<300	<3.0	<3.0	<3.0	<3.0
TOLUENE UG/L	34010 GMS	15000	<6.0	100	38	<6.0	35	<6.0	<6.0	<6.0	<6.0	<600	<6.0	<6.0	<6.0	<6.0
1,1,1-TRICHL'ETHANE UG/L	34506 GMS	<38	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<380	<3.8	<3.8	<3.8	<3.8
1,1,2-TRICHL'ETHANE UG/L	34511 GMS	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<500	<5.0	<5.0	<5.0	<5.0
TRICHLOROETHENE UG/L	39180 GMS	<30	<1.0	<3.0	<3.0	<3.0	3.4	<3.0	<3.0	<3.0	<3.0	5000	7.4	49	<3.0	<3.0
TRICHLOROFLUORO-METHANE UG/L	34488 GMS	<32	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	14	<320	<3.2	<3.2	<3.2	<3.2
VINYL CHLORIDE UG/L	39175 GMS	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<1.0	<1.0	<1.0	<1.0
ACROLEIN UG/L	34210 GMS	<1000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<10000	<100	<100	<100	<100
ACRYLONITRILE UG/L	34215 GMS	<1000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<10000	<100	<100	<100	<100
DICHLORODIFLUORO-METHANE UG/L	34668 GMS	<100	<10	<10	<10	<10	<10	<10	<10	<10	<10	<1000	<10	<10	<10	<10
M-XYLENE UG/L	98553 GMS	4400	<12	30	14	<12	<12	<12	<12	<12	<12	2400	<12	<12	<12	<12
O-AND/OR-P XYLENE UG/L	98554 GMS	4600	<12	32	14	<12	<12	<12	<12	<12	<12	2100	<12	<12	<12	<12
METHYL ETHYL KETONE UG/L	81595 GMS	<480	<48	<48	<48	<48	<48	<48	<48	<48	<48	<4800	<48	<48	<48	<48
METHYL ISOBUT'KETONE UG/L	81596 GMS	<120	<12	<12	<12	<12	<12	<12	<12	<12	<12	<1200	<12	<12	<12	<12

Doc No: CLEJ-00258-1.02-05/01/88

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PROJECT NUMBER 86447 0400 · PROJECT NAME NAVY - LEJEUNE
FIELD GROUP LJHP-I LAB COORDINATOR J.D. SHAMIS

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	HPGW14 LJHP-I 16	HPGW15 LJHP-I 17	HPGW16 LJHP-I 18	HPGW17 LJHP-I 19	HPGW18 LJHP-I 20	HPGW19 LJHP-I 21	HPGW20 LJHP-I 22	HPGW21 LJHP-I 23	HPGW22 LJHP-I 24	HPGW23 LJHP-I 25	HPGW24 LJHP-I 26	HPGW25 LJHP-I 27	HPGW26 LJHP-I 28	HPGW29 LJHP-I 31
DATE TIME		01/14/87 17:37	01/15/87 10:46	01/15/87 12:27	01/15/87 13:56	01/15/87 17:25	01/16/87 10:12	01/16/87 11:50	01/16/87 14:35	01/19/87 10:20	01/19/87 11:30	01/19/87 14:00	01/19/87 14:50	01/19/87 16:30	01/20/87 11:20
LEAD, TOTAL UG/L	1051 ICAP	<27.0	46.0	45.0	<27.0	<27.0	<27.0	46.0	<27.0	27.0	38.0	<27.0	<27.0	31.0	<27.0
OIL&GR, IR MG/L	560 1	0.2	<0.1	0.2	<0.1	<0.1	0.2	<0.1	0.2	1	0.6	0.1	0.2	0.2	0.2
BENZENE UG/L	34030 GMS	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	2.0	<1.0	<1.0	<1.0
BROMODICHLOROMETHANE UG/L	32101 GMS	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<22	<220	<2.2	<2.2	<2.2
BROMOFORM UG/L	32104 GMS	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<47	<470	<4.7	<4.7	<4.7
BROMOMETHANE UG/L	34413 GMS	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<58	<580	<5.8	<5.8	<5.8
CARBON TETRACHLORIDE UG/L	32102 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<28	<280	<2.8	<2.8	<2.8
CHLOROBENZENE UG/L	34301 GMS	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<60	<600	<6.0	<6.0	<6.0
CHLOROETHANE UG/L	34311 GMS	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<82	<820	<8.2	<8.2	<8.2
2-CHLOROETHYLVINYL ETHER UG/L	34576 GMS	<15	<15	<15	<15	<26	<15	<15	<15	<15	<150	<1500	<15	<15	<15
CHLOROFORM UG/L	32106 GMS	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<16	<160	<1.6	<1.6	<1.6
CHLOROMETHANE UG/L	34418 GMS	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<43	<430	<4.3	<4.3	<4.3
DIBROMOCHLOROMETHANE UG/L	32105 GMS	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<31	<310	<3.1	<3.1	<3.1
1,1-DICHLOROETHANE UG/L	34496 GMS	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<47	12	<4.7	<4.7	<4.7
1,2-DICHLOROETHANE UG/L	34531 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<28	<280	<2.8	<2.8	<2.8
1,1-DICHLOROETHYLENE UG/L	34501 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<28	<280	<2.8	<2.8	<2.8
TRANS-1,2-DICHLORO ETHENE UG/L	34546 GMS	<1.6	<1.6	<1.6	<1.6	<1.6	2.5	<1.6	<1.6	<1.6	830	6400	<1.6	<1.6	<1.6
1,2-DICHLOROPROPANE UG/L	34541 GMS	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<60	<600	<6.0	<6.0	<6.0
CIS-1,3-DICHLORO PROPENE UG/L	34704 GMS	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<500	<5.0	<5.0	<5.0
TRANS-1,3-DICHLORO PROPENE UG/L	34699 GMS	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<64	<640	<6.4	<6.4	<6.4

DOC NO: CLEJ-00258-1.02-05/01/88

ENVIRONMENTAL SCIENCE & ENGINEERING 10/01/87 STATUS: FINAL PAGE# 3

PROJECT NUMBER 86447 0405
FIELD GROUP LJHP-3

PROJECT NAME NAVY - LEJEUNE HP3
PROJECT MANAGER J.D. SHAMIS
LAB COORDINATOR JEFF SHAMIS

PARAMETERS UNITS	STORET # METHOD	HPGW14 LJHP-3 16	HPGW15 LJHP-3 17	HPGW16 LJHP-3 18	HPGW17 LJHP-3 19	HPGW18 LJHP-3 20	HPGW19 LJHP-3 21	SAMPLE ID/# HPGW20 LJHP-3 22	HPGW21 LJHP-3 23	HPGW22 LJHP-3 24	HPGW23 LJHP-3 25	HPGW24 LJHP-3 26	HPGW25 LJHP-3 27	HPGW26 LJHP-3 28	HPGW29 LJHP-3 29
DATE TIME		05/28/87 11:45	05/28/87 13:00	05/28/87 13:20	05/28/87 14:14	05/28/87 13:57	05/28/87 15:10	05/28/87 15:50	05/28/87 18:12	05/29/87 10:03	05/29/87 09:35	05/29/87 11:05	05/29/87 11:23	05/29/87 12:45	05/29/87 13:05
LEAD, TOTAL UG/L	1051 ICAP	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2	<49.2
OIL&GR, IR MG/L	560 I	<0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
BENZENE UG/L	34030 GMS	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<100	<100	<1.0	<1.0	<1.0
BROMODICHLOROMETHANE UG/L	32101 GMS	<2.7	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<220	<220	<2.2	<2.2	<2.2
BROMOFORM UG/L	32104 GMS	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<470	<470	<4.7	<4.7	<4.7
BROMOMETHANE UG/L	34413 GMS	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8	<580	<580	<5.8	<5.8	<5.8
CARBON TETRACHLORIDE UG/L	32102 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<280	<280	<2.8	<2.8	<2.8
CHLOROBENZENE UG/L	34301 GMS	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<600	<600	<6.0	<6.0	<6.0
CHLOROETHANE UG/L	34311 GMS	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2	<820	<820	<8.2	<8.2	<8.2
2-CHLOROETHYLVINYL ETHER UG/L	34576 GMS	<26	<26	<26	<26	<26	<26	<26	<26	<26	<1500	<1500	<26	<26	<26
CHLOROFORM UG/L	32106 GMS	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<160	<160	<1.6	<1.6	<1.6
CHLOROMETHANE UG/L	34418 GMS	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<430	<430	<4.3	<4.3	<4.3
DIBROMOCHLOROMETHANE UG/L	32105 GMS	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<310	<310	<3.1	<3.1	<3.1
1,1-DICHLOROETHANE UG/L	34496 GMS	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<470	<470	<4.7	<4.7	<4.7
1,2-DICHLOROETHANE UG/L	34531 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<280	<280	<2.8	<2.8	<2.8
1,1-DICHLOROETHYLENE UG/L	34501 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<280	<280	<2.8	<2.8	<2.8
TRANS-1,2-DICHLORO ETHENE UG/L	34546 GMS	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	7100	4000	<1.6	<1.6	<1.6
1,2-DICHLOROPROPANE UG/L	34541 GMS	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<600	<600	<6.0	<6.0	<6.0
CIS-1,3-DICHLORO PROPENE UG/L	34704 GMS	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<500	<500	<5.0	<5.0	<5.0
TRANS-1,3-DICHLORO PROPENE UG/L	34699 GMS	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<640	<640	<6.4	<6.4	<6.4

Doc NO! CLEJ-00258-1.02-05/01/88

ENVIRONMENTAL SCIENCE & ENGINEERING 09/15/87 STATUS: FINAL PAGE# 1

PROJECT NUMBER 86447 0406 PROJECT NAME NAVY - LEJEUNE IIP4
FIELD GROUP LJHP-4 LAB COORDINATOR JEFF SHAMIS

SAMPLE ID/#

PARAMETERS UNITS	STORET # METHOD	HPGW9-2 LJHP-4 1	HPGW9-3 LJHP-4 2	HPGW17-2 LJHP-4 3	HPGW17-3 LJHP-4 4	HPGW24-2 LJHP-4 5	HPGW24-3 LJHP-4 6
DATE TIME		08/06/87 11:30	08/06/87 12:14	08/05/87 16:13	08/05/87 16:04	08/06/87 13:15	08/06/87 13:28
BENZENE UG/L	34030 GMS	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
BROMODICHLOROMETHANE UG/L	32101 GMS	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
BROMOFORM UG/L	32104 GMS	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7
BROMOMETHANE UG/L	34413 GMS	<5.8	<5.8	<5.8	<5.8	<5.8	<5.8
CARBON TETRACHLORIDE UG/L	32102 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
CHLOROBENZENE UG/L	34301 GMS	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
CHLOROETHANE UG/L	34311 GMS	<8.2	<8.2	<8.2	<8.2	<8.2	<8.2
2-CHLOROETHYLVINYL ETHER UG/L	34576 GMS	<15	<15	<15	<15	<15	<15
CHLOROFORM UG/L	32106 GMS	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
CHLOROMETHANE UG/L	34418 GMS	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3
DIBROMOCHLOROMETHANE UG/L	32105 GMS	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1
1,1-DICHLOROETHANE UG/L	34496 GMS	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7
1,2-DICHLOROETHANE UG/L	34531 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
1,1-DICHLOROETHYLENE UG/L	34501 GMS	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
TRANS-1,2-DICHLORO ETHENE UG/L	34546 GMS	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
1,2-DICHLOROPROPANE UG/L	34541 GMS	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
CIS-1,3-DICHLORO PROPENE UG/L	34704 GMS	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TRANS-1,3-DICHLORO PROPENE UG/L	34699 GMS	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4
ETHYLBENZENE UG/L	34371 GMS	<7.2	<7.2	<7.2	<7.2	<7.2	<7.2
METHYLENE CHLORIDE UG/L	34423 GMS	<50	<50	<50	<50	<50	<50

Agency for Toxic Substances and Disease Registry

Division of Health Studies

VOLATILE ORGANIC COMPOUNDS IN DRINKING WATER AND ADVERSE PREGNANCY OUTCOMES

UNITED STATES MARINE CORPS BASE

CAMP LEJEUNE, NORTH CAROLINA

August 1998

U.S. DEPARTMENT OF HEALTH
& HUMAN SERVICES
Agency for Toxic Substances
and Disease Registry
Atlanta, Georgia 30333

wells were closed in November and December 1984. Tap water sampling conducted in December after the closure of these seven wells showed no additional evidence of contamination. However, on January 27, 1985, a fuel pump broke at the Holcomb Boulevard water system. Water from Hadnot Point was supplied to the Holcomb Boulevard service area while repairs were conducted. Tap water samples taken from buildings temporarily supplied by Hadnot Point contained high levels of TCE, which prompted additional tap and finished water sampling for VOCs at Hadnot Point and Tarawa Terrace. Contaminated wells in both water systems were closed soon after they were identified in January and February 1985, and routine sampling was implemented at all distribution systems on the base. Notable contamination has not been detected in Camp Lejeune's drinking water systems since February 1985.

The Hadnot Point system has been used primarily for industrial purposes, but the Hospital Point housing area also receives water from the Hadnot Point system. This small housing area was populated by hospital personnel and their families until 1983, when the area became housing for a more diverse group of officers' families. It is not known when the Hadnot Point supply wells first became contaminated, but VOCs were present for at least 2½ years. Industrial activity on the base began in the 1940s. No records indicate when the VOC plumes that contaminated supply wells in the Hadnot Point system originated. A chronology of these events is included in Table 1.

At Tarawa Terrace, the highest concentrations of contaminants measured in tap water samples were 215 parts per billion (ppb) PCE, 8 ppb TCE, and 12 ppb 1,2-DCE. This distribution system continued to serve base family housing until 1986. The highest contaminant levels measured in tap water samples from Hadnot Point were 1,400 ppb TCE and 407 ppb 1,2-DCE.

Contamination at Tarawa Terrace probably occurred many years before it was first documented in 1982. The source of the PCE at Tarawa Terrace was the ABC One-Hour Cleaners, a dry-cleaning establishment near Tarawa Terrace *(3)*. PCE leaked into the groundwater from the company's septic system. According to EPA records, the septic system was in operation from 1954 through 1985. In 1958, military personnel dug a supply well for the Tarawa Terrace system approximately 900 feet from the dry cleaners. Because this supply well was near the contaminated septic system, because few changes were made in the dry-cleaning operation after 1960 *(4)*, and because of the very permeable aquifer at Camp Lejeune, the Tarawa Terrace well probably was contaminated soon after it was built. Human exposure to PCE and other contaminants through this well could have occurred for as long as 30 years *(3)*.

The housing areas that received contaminated water in each exposure group, the contaminants, and the estimated contaminant levels are summarized in Table 2. Each of the affected housing areas received water containing a mixture of many contaminants, a phenomenon noted with almost every population exposed to contaminants released from hazardous waste sites. For simplicity, each group of exposed housing areas is referred to by the predominant contaminant in the mixture. Residents of Tarawa Terrace are referred to as the PCE-exposed group, and residents of Hospital Point are referred to as the long-term TCE-exposed group. The short-term TCE-exposed group comprises residents of Berkeley Manor, Midway Park, Paradise Point, and Watkins Village during the 12-day period from January 27 through February 7, 1985, when these residents received water from the same supply as Hospital Point residents.

The exposure data, summarized in Tables 3 and 4, are limited. Water samples were collected on three different dates; the May 1982 samples, however, were preserved for several months before they were analyzed, which might have decreased the observed concentration of VOCs. Moreover, the 1985 sampling at Hadnot Point was conducted after seven of eight contaminated wells were closed. Hence, the expected contamination levels in the Hadnot Point distribution system before 1985 would have been higher than the concentrations measured in 1985. In addition, one supply well for the Hadnot Point distribution system contained concentrations of benzene as high as 700 ppb. Because the 1982 analyses were limited to TCE and PCE, and because the well containing benzene was shut off before the distribution system was sampled again, benzene was never detected in Hadnot Point tap water. Nonetheless, low-level exposure (an estimated 35 ppb) would have been expected among women receiving Hadnot Point water before December 1984.

An important feature of the exposure at Camp Lejeune was its intermittent nature. Each of the contaminated systems had more wells than were necessary to supply water on any one day. Contaminant levels have been noted to differ with the supply wells in service. The process by which a particular well was selected for use was essentially random, but all wells presumably were used in a given month unless they were out of service for mechanical failure or contamination. Daily or monthly well-usage logs were not available for evaluation. Despite these variations, on any specified day, VOC concentrations were probably distributed uniformly to all residential units because the water from all wells was mixed before treatment and distribution. For example, on January 31, 1985, VOC concentrations were similar in tap water samples obtained from several different buildings (Table 4).

HUMAN HEALTH EFFECTS OF CONCERN

Human gestation is a time of great vulnerability to environmental and pharmacologic agents. Environmental exposure to mercury has been shown to cause adverse effects in utero even though the pregnant woman is unaffected *(5)*. The outcomes evaluated (i.e., decreased MBW, SGA, and preterm delivery) are several of the many possible adverse pregnancy outcomes that might be associated with exposure to environmental toxins *(6)*. These outcomes are important because of their contribution to infant mortality and morbidity; moreover, they are among the most practical outcomes to study near hazardous waste sites because they are common, well-ascertained, and reported in a standardized fashion on birth records *(7)*. Birth records also include information on maternal residence. These practical aspects of the study outcomes are important in situations, such as that at Camp Lejeune, in which exposure ceased almost 10 years before the study and most of the exposed population had moved in the intervening period.

Intrauterine growth retardation (measured as decreased MBW and SGA) and preterm delivery are two conditions with distinct pathogeneses that are usually grouped together and measured as low birth weight. In 1989, 7.0% of infants had low birth weight, weighing <2,500 grams (g) at birth *(8)*. Low birth weight is the third most important predictor of infant mortality in the United States and the most important predictor of infant mortality among blacks in the United States *(9)*. In 1980, the risk for infant mortality for singleton infants with very low birth weight (i.e., <1,500 g at birth) was 94 times higher than for infants of normal birth weight (>2,500 g at birth) *(10)*. Low birth weight and very low birth weight infants are also at greater risk for neurodevelopmental handicaps (e.g., cerebral palsy and seizure disorder), lower respiratory tract conditions, and complications from neonatal care *(11)*.

Distinguishing between effects on fetal growth and effects on gestational age at delivery is often difficult because growth and maturity of an infant are both highly dependent on gestational age. Infants who are born small because they are born at <37 weeks of gestation are considered to be preterm. Approximately 10% of all infants born during 1988 in the United States were preterm *(12)*. Approximately 40% of these preterm infants weighed <2,500 g *(12)*. Such infants are clearly at higher risk for morbidity and mortality. The risk for fetal death is three times higher for infants surviving to 26 weeks than for infants surviving to 40 weeks *(13)*. Factors predictive of preterm delivery include maternal socioeconomic status, race-ethnicity, cigarette smoking, stress, nutrition, past pregnancy history, access to prenatal care, and medical complications such as sexually transmitted diseases, infection, hypertension, and preeclampsia *(14)*.

Infants who have sufficient time to grow and mature but have low birth weight often are less viable because of intrauterine processes that delayed their growth. In general, whether preterm or full-term, growth-retarded infants are at greater risk for antenatal and neonatal mortality than full-term infants who are at the appropriate weight for their gestational age *(14, 15)*. SGA infants are those within the bottom tenth percentile of the birth weight distribution at any given gestational age. As with other population-based measures, some SGA infants will be healthy and simply smaller than average, but many will be growth retarded. At present, SGA is the only marker for intrauterine growth retardation that is readily available for population-based studies.

Biologic factors reducing growth include young maternal age, low maternal prepregnant weight, short maternal height, insufficient maternal weight gain during pregnancy, maternal alcohol consumption, and anoxia resulting from cigarette smoking and altitude *(14,16)*. Maternal medical complications, such as hypertension, can also produce anoxic conditions resulting in SGA infants *(17)*. Plurality, the sex of the infant, and maternal parity also influence birth weight. Important social determinants of SGA infants in the United States are maternal race, education, socioeconomic status, and utilization of prenatal care (*14*).

Late fetal deaths (i.e., stillbirths) occur more rarely than preterm birth and SGA but account for a greater proportion of perinatal mortality. Late fetal deaths, defined as fetal deaths occurring after 20 weeks of gestation, account for approximately 80% of all perinatal deaths.

0436

Tom

Keep in ATSDR File

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

DEHNR

December 8, 1994

Mr. Max M. Howie, Jr.
Chief, Program Evaluation, Records,
and Information Services Branch
Agency for Toxic Substances and Disease Registry
1600 Clifton Road (E-56)
Atlanta, Georgia 30333

RE: Public Health Assessment for U.S. Marine Corps Base Camp Lejeune, Jacksonville, North Carolina, Dated September 8, 1994.

Dear Mr. Howie:

The referenced report has been reviewed by the NC Superfund Section. Our comments are attached. We apologize for the late submittal of these comments, however we did not receive the document until November 14, 1994. Thank you for providing us an opportunity to review this assessment. If you have any questions about this, please call me at (919) 733-2801.

Sincerely,

Patrick Watters

Patrick Watters
Environmental Engineer
Superfund Section

Attachment

cc: Jack Butler
Neal Paul - MCB Camp Lejeune
Linda Saksvig, P.E. - LANTDIV
Katherine Landman - LANTDIV

P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-4996 FAX 919-715-3605
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Comments on the
Public Health Assessment (PHA)
for the
U. S. Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

1. General - Available Information

   The intent of this report is to provide a comprehensive health assessment of the Camp Lejeune Marine Corps Base. Camp Lejeune has been on the National Priorities List since November 1989 and as a result, a wealth of data and information is available regarding the health and environmental impacts of the various sites. Because this document is to be used by the general public, it is imperative that appropriate, up to date resources be used to generate a technically accurate document that communicates the risks in a responsible manner.

   A review of the References listed at the back of the document (pages 50-52), reveals that the vast majority of the NPL related documents were not used in the preparation of this report. There are only 5 references cited (3, 15, 25, 38, and 39) that are NPL documents related to Camp Lejeune. Three of these are summary type documents that do not include significant amounts of data (documents 3, 38, and 39). The other two documents are Remedial Investigation Documents specific only to Site 2 and Sites 6,9, and 82 (documents 15 and 25).

   The concern here is that there is information essential to this health assessment that apparently was not considered. Several comments below regarding incorrect conclusions could have been avoided had these NPL documents been reviewed. These documents are in the public domain and are available from EPA, Camp Lejeune and the State of North Carolina.

2. Page 1, Summary

   The second paragraph indicates that "previously accepted" hazardous material handling and disposal methods led to environmental contamination at several areas on base. This may be misleading to the general public in that it implies that there has always been some degree of State and/or Federal agency concurrence. Camp Lejeune was in existence long before there were any significant environmental regulations or standards to define "accepted" methods.

3. Page 1, Summary

   The next to the last paragraph on this page states that there is a "...widespread problem with lead leaching from faucets or water pipes..." Page 12 of the PHA states that "They found no buildings with lead piping..." This report needs to be changed to indicate that the source of the lead is from the solder used to connect the copper service lines and not from lead faucets or pipes. (see also comment 4)

4. Page 9, Table 1
   This comment is like # 3 in that the source of lead contamination is said to be from "lead plumbing" which is misleading if the source is actually the lead solder used for the copper pipes as stated on page 12.

5. Page 16, 4th Paragraph
   This paragraph should be changed to indicate that the pesticide contaminated soils at Site 2 have been removed.

6. Page 17, 1st Paragraph of Lawn-Care Workers
   The exposure scenario for lawn care workers at Site 2 assumes that the grass is cut three days per week. This is conservative by at least a factor of three and should be clearly indicated as such in the discussion.

7. Page 25, 1st Paragraph
   This paragraph states in part that "...cancerous health effects are unlikely; however, not enough scientific information is available to definitely rule out the possibility of cancerous health effects from low dose exposure to VOCs...". This is potentially misleading to the general public because it implies that the concept of zero risk is obtainable if enough scientific information is made available. Risk assessment is a mathematical operation that can be zero only if the contaminant levels are zero or the exposure time is zero. It is imperative that the health risks be communicated responsibly so that the affected public can make informed rational decisions.

8. Page 26, Table 3
   Please reference the source of the Drinking Water Standards shown in this table. Also note that there are drinking water and groundwater standards which may not be the same.

9. Page 28, 5th Paragraph
   Same as comment 7 regarding risk communication.

10. Page 30, Table 4
    The last column on the right hand side indicated that there is no increase in the cancer risk for the adult scenario for VOC exposures. This is inappropriate risk communication as well as being inconsistent with previous statements regarding cancer risks due to VOCs (see comments 7 and 9).

11. Page 32, Summary and Follow-up Paragraph
    This paragraph states that "existing" data for Site 48 has not been provided for review. The PHA does not elaborate on what this "existing data" is however there is considerable data on Site 48 in the Remedial Investigation Report which has been in

final form and in the public domain since June 1993. The other concern is why was this PHA issued for comment before all of the data was reviewed? See the general comment regarding document references.

12. Pages 33 and 34 (Sites 6, 9, and 82)
This discussion needs to be revised to reflect the fact that Wallace and Bearhead creeks were resampled and the results are currently being reviewed by the State of North Carolina with regard to the need to issue a fish consumption advisory. See the general comment regarding document references.

13. Page 35, Section III - No Apparent Health Hazards
The report concludes that Sites 43, 69 and 28 have no apparent health hazard. While there is some data on these sites, none of these are at the Final RI Report stage. None of the existing data reports on these sites were cited in the reference list therefore the basis for this conclusion is unclear. See also the general comment on document references.

14. Page 35, Section IIIB
The description of Site 69 indicates that beta radiation sources were disposed of on this site. The Remedial Investigation Work Plan prepared for this site does not mention any radiation hazard on this site.

15. Page 36, Section IV - No Health Hazard
See comment # 13 regarding the fish contamination at Site 28.

16. Page 44, Planned Action # 1
The PHA should indicate that the pesticide contaminated soils at Site 2 have been removed.

17. Page 45, Planned Action # 1 for Groundwater Contamination
This states that "No additional actions are being planned at this time." This statement is incorrect. There are many actions to address groundwater contamination that are at various levels of completion. See the general comment regarding document references.

18. Page 46, Planned Action # 1 for Fish Contamination
Supplemental sampling has been performed for Wallace and Bearhead creeks. See comment # 10 and the general comment on document references.

19. Page 47, Planned Action # 1 for Soil Contamination at Site 69
This section states that "No additional actions are planned at this time. This is incorrect. This area has been assessed and the data and proposed remedial actions are currently under review. See the general comment regarding document references.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

May 4, 2007

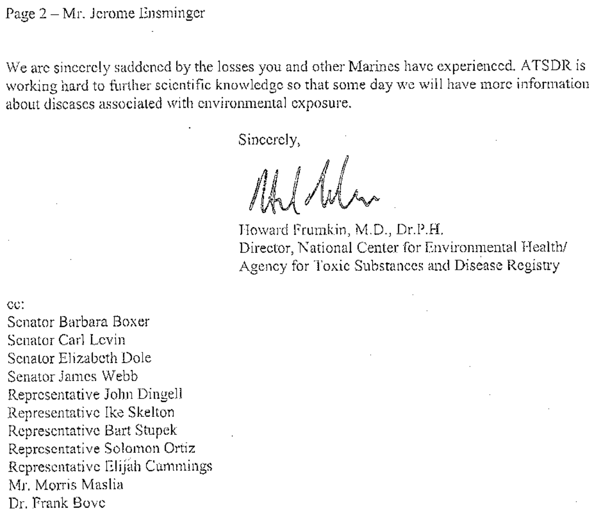
Mr. Jerome M. Ensminger
8270 Highway 41 West
Richlands, North Carolina 28574

Dear Mr. Ensminger:

Thank you for your letter of April 16, 2007, expressing concern about the validity of the 1997 Public Health Assessment for Marine Corps Base Camp Lejeune. As a scientific public health agency, it is important to us that our reports contain the most current and scientifically correct information available at the time.

We acknowledge that the references used for the development of the 1997 public health assessment are no longer available in the Agency for Toxic Substances and Disease Registry's (ATSDR) files. A move of ATSDR staff resulted in our files of Camp Lejeune-related documents being temporarily relocated. A private contractor mistakenly disposed of the documents. Although unfortunate that the material referenced in the public health assessment is no longer available in ATSDR's files, the original information and data, with the exception of original ATSDR references, may still be available from their original sources.

The 1997 public health assessment (PHA) evaluated exposures based on data that was first collected in 1982. There was no sampling data prior to 1982. There was no error in the PHA; however, there were data gaps. The PHA fulfilled its purpose in identifying exposed populations, concluding that more information was needed, and recommending further epidemiological studies to help identify potential health effects. The water modeling effort has provided additional information about the exposure prior to 1982 and has increased the knowledge of the usage of the water distribution systems. This new information has better defined timelines of contamination in drinking water. ATSDR will use the new exposure information to reassess the 1998 Sonnenfeld et al. study, as well as for any new epidemiological studies.



Page 2 – Mr. Jerome Ensminger

We are sincerely saddened by the losses you and other Marines have experienced. ATSDR is working hard to further scientific knowledge so that some day we will have more information about diseases associated with environmental exposure.

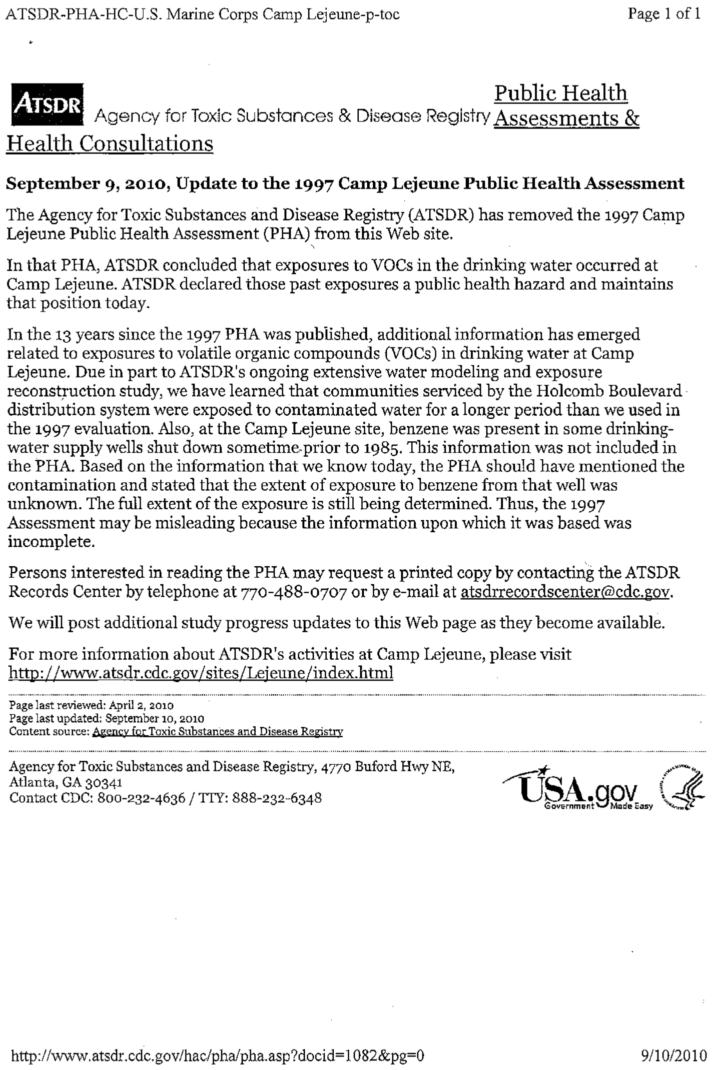
Sincerely,

Howard Frumkin, M.D., Dr.P.H.
Director, National Center for Environmental Health/
Agency for Toxic Substances and Disease Registry

cc:
Senator Barbara Boxer
Senator Carl Levin
Senator Elizabeth Dole
Senator James Webb
Representative John Dingell
Representative Ike Skelton
Representative Bart Stupek
Representative Solomon Ortiz
Representative Elijah Cummings
Mr. Morris Maslia
Dr. Frank Bove

bcc:
NCEH/ATSDR/OD
ATSDR Washington Office
William Cibulas, DHAC/OD
Sandy Isaacs, DHAC/SRAB
Gary Campbell, DHAC/SRAB
Carole Hossom, DHAC/SRAB
Robert Safay, DRO, Region IV
ATSDR Records Center

ATSDR:DHAC:07SRAB07:4/23/2007
K:\SRAB\DEFENSE\SITES\NAVY\LEJEUNE\ AI 8725 Frumkin to Ensminger 5-1-2007B.doc
Prepared by: Carole Hossom (404) 498-0372
Contact Person: Sandra Isaacs (404) 498-0108
Spelling verified by: CStormark



ATSDR-PHA-HC-U.S. Marine Corps Camp Lejeune-p-toc Page 1 of 1

ATSDR Agency for Toxic Substances & Disease Registry Public Health Assessments & Health Consultations

September 9, 2010, Update to the 1997 Camp Lejeune Public Health Assessment

The Agency for Toxic Substances and Disease Registry (ATSDR) has removed the 1997 Camp Lejeune Public Health Assessment (PHA) from this Web site.

In that PHA, ATSDR concluded that exposures to VOCs in the drinking water occurred at Camp Lejeune. ATSDR declared those past exposures a public health hazard and maintains that position today.

In the 13 years since the 1997 PHA was published, additional information has emerged related to exposures to volatile organic compounds (VOCs) in drinking water at Camp Lejeune. Due in part to ATSDR's ongoing extensive water modeling and exposure reconstruction study, we have learned that communities serviced by the Holcomb Boulevard distribution system were exposed to contaminated water for a longer period than we used in the 1997 evaluation. Also, at the Camp Lejeune site, benzene was present in some drinking-water supply wells shut down sometime prior to 1985. This information was not included in the PHA. Based on the information that we know today, the PHA should have mentioned the contamination and stated that the extent of exposure to benzene from that well was unknown. The full extent of the exposure is still being determined. Thus, the 1997 Assessment may be misleading because the information upon which it was based was incomplete.

Persons interested in reading the PHA may request a printed copy by contacting the ATSDR Records Center by telephone at 770-488-0707 or by e-mail at atsdrrecordscenter@cdc.gov.

We will post additional study progress updates to this Web page as they become available.

For more information about ATSDR's activities at Camp Lejeune, please visit http://www.atsdr.cdc.gov/sites/Lejeune/index.html

Page last reviewed: April 2, 2010
Page last updated: September 10, 2010
Content source: Agency for Toxic Substances and Disease Registry

Agency for Toxic Substances and Disease Registry, 4770 Buford Hwy NE,
Atlanta, GA 30341
Contact CDC: 800-232-4636 / TTY: 888-232-6348

http://www.atsdr.cdc.gov/hac/pha/pha.asp?docid=1082&pg=0 9/10/2010

ATSDR Agency for Toxic Substances & Disease Registry

Public Health Assessments & Health Consultations

May 8, 2009 Update to the 1997 Camp Lejeune Public Health Assessment
The Agency for Toxic Substances and Disease Registry (ATSDR) has removed the 1997 Camp Lejeune Public Health Assessment (PHA) from this web site.

In the 12 years since the 1997 PHA was published, additional information has emerged related to exposures to volatile organic compounds (VOCs) in drinking water at Camp Lejeune. Due in part to ATSDRâ€™s ongoing extensive water modeling and exposure reconstruction study, we have learned that communities serviced by the Holcomb Boulevard distribution system were exposed to contaminated water for a longer period than we knew in 1997. Also, at the Camp Lejeune site, benzene was present in one drinking-water supply well in the Hadnot Point drinking water system. That well was shut down sometime prior to 1985. This information should have been included in the PHA but was not. The PHA should have mentioned the contamination and stated that the extent of exposure to benzene from that well was unknown.

At this time, ATSDR has insufficient information to determine if children or adults were adversely affected by these exposures. ATSDR is conducting studies to determine if past exposures to VOCs from contaminated drinking water are associated with certain birth defects and childhood cancers among children born to parents who were living at Camp Lejeune. Additional epidemiologic studies are being pursued to evaluate illnesses among adults who lived on the base.

The PHA spurred beneficial public health research, including the ongoing water modeling, exposure reconstruction, and epidemiological studies. Although the drinking water section needs to be updated, the PHA contains valuable and accurate historical information about nine other exposure pathways. Much of what we now know about the potential for adverse health effects related to exposures at Camp Lejeune is owed to this 1997 document. We are currently studying the extent of benzene and other VOC contamination in the Hadnot Point drinking water system. Once we have completed the water modeling and exposure reconstruction studies, ATSDR will re-analyze the drinking water pathway for the Camp Lejeune site, communicate findings to the public, and update the public health assessment.

Exposures to VOCs in the drinking water occurred at Camp Lejeune. ATSDR declared those past exposures a public health hazard and we maintain that position today. Persons interested in reading the PHA may request a printed copy by contacting the ATSDR Records Center by telephone at 770-488-0707 or by e-mail at atsdrrecordscenter@cdc.gov.

We will post additional study progress updates to this web page as they become available.

For more information about ATSDR's activities at Camp Lejeune, please visit http://www.atsdr.cdc.gov/sites/Lejeune/index.html

Page last reviewed: April 2, 2010
Page last updated: April 2, 2010

ATSDR Agency for Toxic Substances & Disease Registry

1997 Public Health Assessment (PHA) (FAQs)

1. Why did the 1997 PHA not mention benzene was present in well 602? (#01)
2. Why did ATSDR remove the 1997 PHA from the ATSDR Camp Lejeune website? (#02)
3. When will the revised PHA be available? (#03)

1. Why did the 1997 PHA not mention benzene was present in well 602?

The 1997 PHA does mention benzene in Appendix B (page B-2-4). It does not mention or discuss benzene in the main body of the PHA because we assumed, incorrectly at the time, that well # 602 was not used to supply contaminated drinking water to residents of Camp Lejeune.

2. Why did ATSDR remove the 1997 PHA from the ATSDR Camp Lejeune website?

In the time since the 1997 PHA was published, additional information emerged related to exposures to volatile organic compounds in drinking water at Camp Lejeune. Due in part to ATSDR's ongoing extensive water modeling and exposure reconstruction study, we learned that communities serviced by the Holcomb Boulevard distribution system were exposed to contaminated water for a longer period than we knew in 1997. Also, at the Camp Lejeune site, benzene was present in one drinking-water supply well in the Hadnot Point drinking water system. That well was shut down sometime prior to 1985. This information should have been included in the PHA but was not. The PHA should have mentioned the contamination and stated that the extent of exposure to benzene from that well was unknown.

3. When will the revised PHA be available?

ATSDR plans to revise the PHA once the water modeling study is complete. Water modeling is a scientifically complex. In the meantime, we continue to stand behind the information related to the other nine pathways.

Page last reviewed: July 6, 2009
Page last updated: July 6, 2009
Content source: Agency for Toxic Substance and Disease Registry

Agency for Toxic Substances and Disease Registry, 4770 Buford Hwy NE,
Atlanta, GA 30341
Contact CDC: 800-232-4636 / TTY: 888-232-6348

USA.gov Government Made Easy

Adverse Pregnancy Outcomes Reanalysis

Study evaluated preterm birth and small for gestational age (SGA) among on-base births during 1968-1985 using birth certificate and base housing databases. Study found associations between elevated risks of SGA and births to mothers whose homes were served by either the Hadnot Point system (high TCE contamination) or the Tarawa Terrace system (high PCE contamination). During the modeling of the water systems for part of the current case-control study of birth defects and childhood cancers (described below), ATSDR identified an error in the 1998 study's exposure classifications that resulted from a lack of information on the operation of a water treatment plant. The 1998 SGA study will be reanalyzed using the water modeling results.

Expected completion date: Spring 2012.

Case-Control Study of Specific Birth Defects and Childhood Cancers

Telephone survey conducted during 1999-2002 identified potential cases of neural tube defects (i.e., spina bifida and anencephaly), cleft lip and cleft palate, leukemia and non-Hodgkin's lymphomas among those born during 1968–1985 to mothers residing on base anytime during their pregnancy. After cases were confirmed by medical records, parental interviews of cases and controls were conducted in 2005. After the results of the water modeling of the two contaminated systems become available, data analyses will be conducted.

Expected completion date: Spring 2012.

Mortality Study of Former Marines and Civilian Employees

Cohorts in the study include active duty Marines stationed on base at any time, June 1975–September 1987 who began active duty service on or after June 1975, and civilians employed at the base at any time, June 1974 – September 1987 who began DOD employment on or after June 1974, and comparison cohorts from Camp Pendleton. This study began in April 2010. This study will look at all causes of death, including cancers and other fatal diseases. This study will also use the results of the water modeling of the two contaminated systems.

Expected completion date: Spring 2012.

Health Survey/Morbidity Study

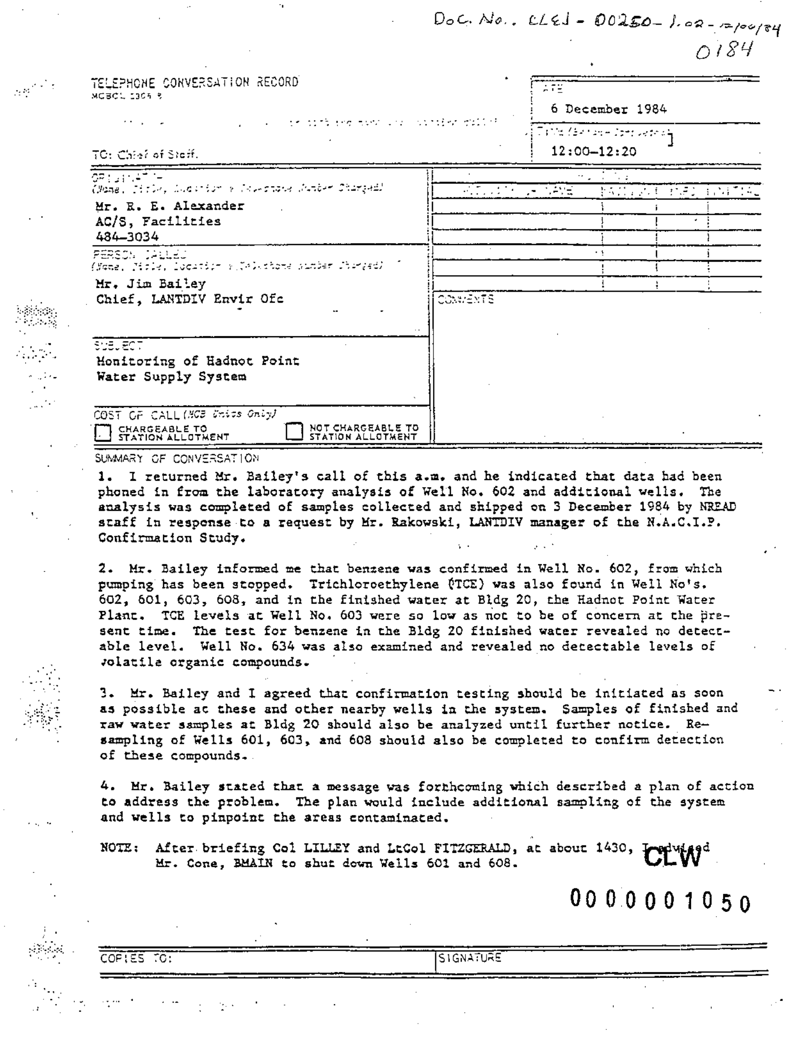
Cohorts in the study include active duty Marines stationed on base at any time, June 1975–September 1987 and civilians employed at the base at any time, December 1972–September 1987, and comparison cohorts from Camp Pendleton. In addition, active duty Marines and their dependents from whom data were collected in the 1999-2002 ATSDR survey (conducted to identify cases for the case-control study of specific birth defects and childhood cancers) will be included in the study. Those who registered with the USMC but who are not members of these cohorts will be sent a survey but will not be included in the morbidity study. The study will consist of the mailing of the surveys (a web version of the survey will also be available) and several follow-up mailings and reminder phone calls to encourage participation. Based on the participation rates, considerations of possible biases, and the recommendations of an ATSDR-convened science panel, ATSDR will decide whether to complete the study by confirming diseases reported by survey participants using medical records or data from state and federal cancer registries. The contract for this study is expected to be awarded in September 2010. The surveys are expected to be mailed starting in December 2010-March 2011.

Expected completion date (including confirmation of diseases): September 2013.

Water Modeling

ASTDR needs certain information about the volatile organic compounds (VOCs) in Camp Lejeune's groundwater and drinking water. Water modeling is a scientific method that will help ATSDR estimate water-system conditions prior to March 1987. Water modeling is needed to characterize historic contamination sources and reconstruct historical drinking water concentrations of PCE (and its degradation by-products of TCE, 1,2-DCE, and vinyl chloride), TCE (and its degradation by-products of 1,2 DCE and vinyl chloride), and benzene. Tarawa Terrace historical reconstruction results were published 2007-2009; Hadnot Point and Holcomb Boulevard reconstruction began June 2007.

Expected completion date: March 2012.



DoC. No., CLEJ - 00250- 1.02 - 12/06/84

0184

TELEPHONE CONVERSATION RECORD
MCBCL 2305 8

TO: Chief of Staff.

DATE
6 December 1984

TIME (Begin - Completed)
12:00–12:20

ORIGINATOR
(Name, Title, Location & Telephone Number Charged)
Mr. R. E. Alexander
AC/S, Facilities
484–3034

PERSON CALLED
(Name, Title, Location & Telephone Number Charged)
Mr. Jim Bailey
Chief, LANTDIV Envir Ofc

SUBJECT
Monitoring of Hadnot Point
Water Supply System

COST OF CALL (MCB Units Only)
☐ CHARGEABLE TO STATION ALLOTMENT ☐ NOT CHARGEABLE TO STATION ALLOTMENT

COMMENTS

SUMMARY OF CONVERSATION

1. I returned Mr. Bailey's call of this a.m. and he indicated that data had been phoned in from the laboratory analysis of Well No. 602 and additional wells. The analysis was completed of samples collected and shipped on 3 December 1984 by NREAD staff in response to a request by Mr. Rakowski, LANTDIV manager of the N.A.C.I.P. Confirmation Study.

2. Mr. Bailey informed me that benzene was confirmed in Well No. 602, from which pumping has been stopped. Trichloroethylene (TCE) was also found in Well No's. 602, 601, 603, 608, and in the finished water at Bldg 20, the Hadnot Point Water Plant. TCE levels at Well No. 603 were so low as not to be of concern at the present time. The test for benzene in the Bldg 20 finished water revealed no detectable level. Well No. 634 was also examined and revealed no detectable levels of volatile organic compounds.

3. Mr. Bailey and I agreed that confirmation testing should be initiated as soon as possible at these and other nearby wells in the system. Samples of finished and raw water samples at Bldg 20 should also be analyzed until further notice. Resampling of Wells 601, 603, and 608 should also be completed to confirm detection of these compounds.

4. Mr. Bailey stated that a message was forthcoming which described a plan of action to address the problem. The plan would include additional sampling of the system and wells to pinpoint the areas contaminated.

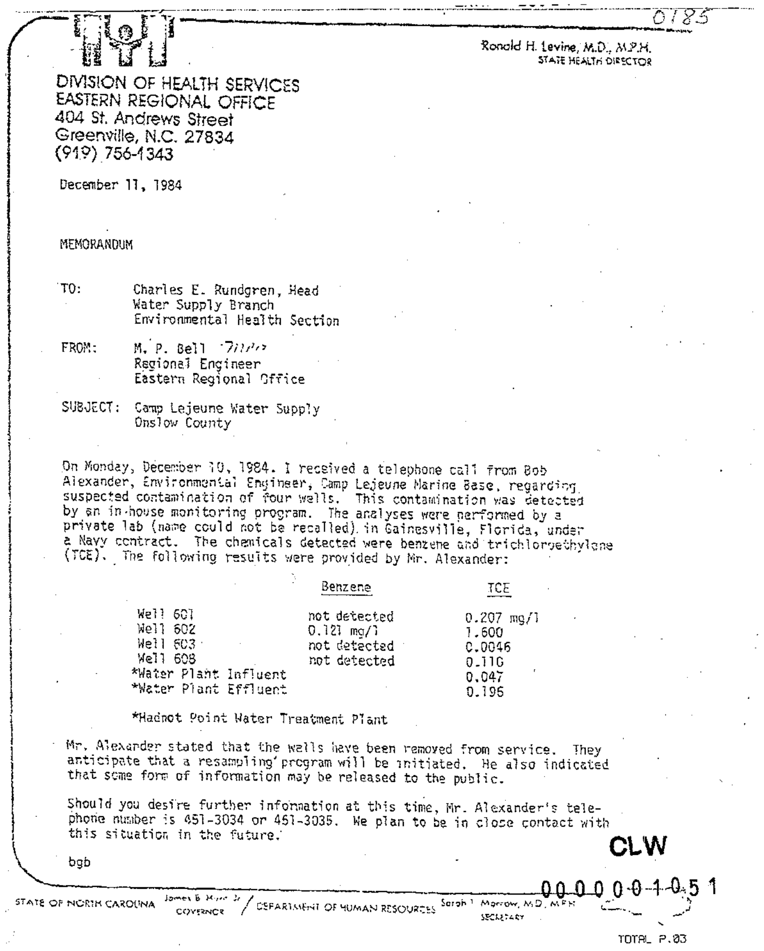
NOTE: After briefing Col LILLEY and LtCol FITZGERALD, at about 1430, I advised Mr. Cone, BMAIN to shut down Wells 601 and 608.

CLW

0000001050

COPIES TO:

SIGNATURE



0185

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES
EASTERN REGIONAL OFFICE
404 St. Andrews Street
Greenville, N.C. 27834
(919) 756-1343

December 11, 1984

MEMORANDUM

TO: Charles E. Rundgren, Head
Water Supply Branch
Environmental Health Section

FROM: M. P. Bell
Regional Engineer
Eastern Regional Office

SUBJECT: Camp Lejeune Water Supply
Onslow County

On Monday, December 10, 1984. I received a telephone call from Bob Alexander, Environmental Engineer, Camp Lejeune Marine Base, regarding suspected contamination of four wells. This contamination was detected by an in-house monitoring program. The analyses were performed by a private lab (name could not be recalled) in Gainesville, Florida, under a Navy contract. The chemicals detected were benzene and trichloroethylene (TCE). The following results were provided by Mr. Alexander:

	Benzene	TCE
Well 601	not detected	0.207 mg/l
Well 602	0.121 mg/l	1.600
Well 603	not detected	0.0046
Well 608	not detected	0.110
*Water Plant Influent		0.047
*Water Plant Effluent		0.195

*Hadnot Point Water Treatment Plant

Mr. Alexander stated that the wells have been removed from service. They anticipate that a resampling program will be initiated. He also indicated that some form of information may be released to the public.

Should you desire further information at this time, Mr. Alexander's telephone number is 451-3034 or 451-3035. We plan to be in close contact with this situation in the future.

bgb

STATE OF NORTH CAROLINA James B. Hunt Jr, GOVERNOR / DEPARTMENT OF HUMAN RESOURCES Sarah T. Morrow, M.D., M.P.H. SECRETARY

REPORT # 7
LABORATORY ANALYSIS ON
NAVAL SAMPLES
(A/E Contract N6270-84-B-6932
JTC REPORT # 84-128

PREPARED FOR:
DEPARTMENT OF NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VA 23511

PREPARED BY:
JTC ENVIRONMENTAL CONSULTANTS, INC.
4 RESEARCH PLACE, SUITE L-10
ROCKVILLE, MARYLAND 20850

DECEMBER 18, 1984

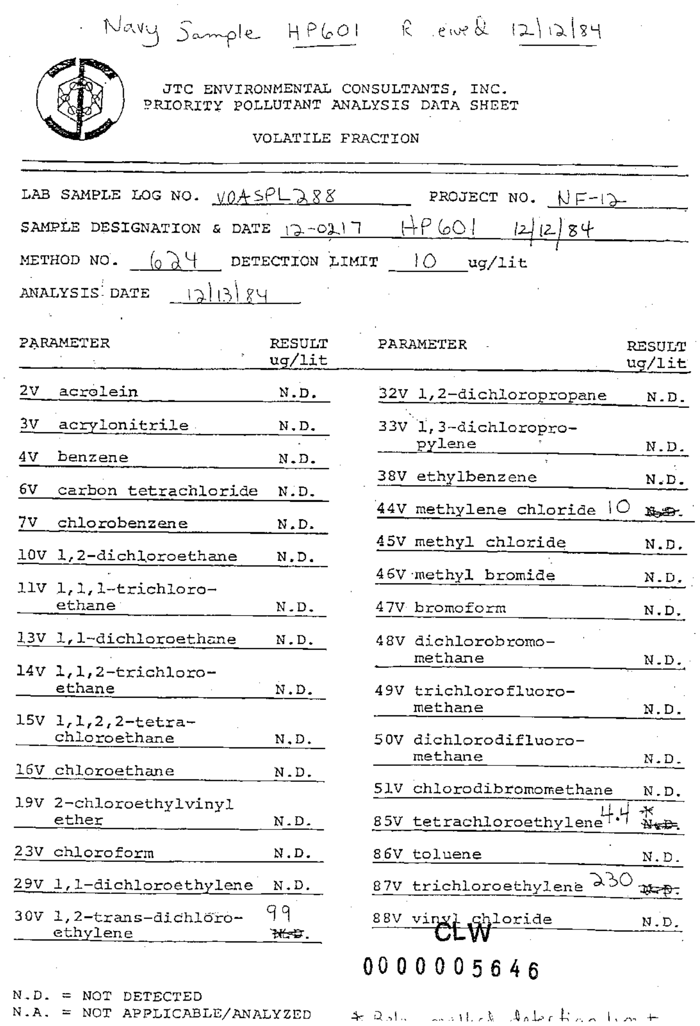
Ann E. Rosecrance
Ann E. Rosecrance
Laboratory Director

JTC Environmental Consultants, Inc.

Date 12/18/84 Report No. 7 to Naval Facilities Engineering Command, Norfolk, Virginia

JTC Data Report No. 84- 128 Table 1 Date of Sample Receipt 12-12-84

NAVY SAMPLE ID	JTC SAMPLE ID	ANALYSIS PARAMETER							
		VOA							
HP 601	12-0217	See attached data sheet							
HP 602	12-0218	see attached data sheet							
HP 603	12-0219	see attached data sheet							
HP 608	12-0220	see attached data sheet							
HP 634	12-0221	see attached data sheet							
HP 637	12-0222	see attached data sheet							
HP 642	12-0223	see attached data sheet							
HP Treated	12-0224	see attached data sheet							



Navy Sample HP601 Received 12/12/84

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. V0ASPL288 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0217 HP601 12/12/84

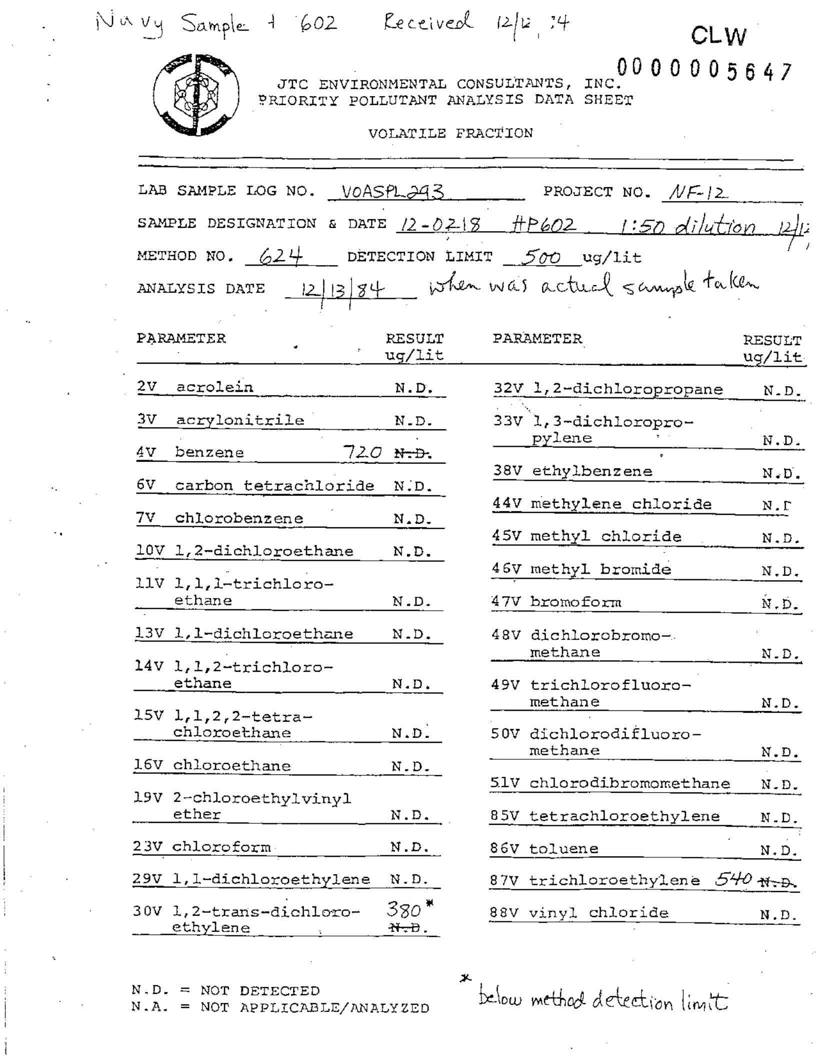
METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 12/13/84

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	10 ~~N.D.~~
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	4.4 * ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	230 ~~N.D.~~
30V 1,2-trans-dichloroethylene	99 ~~N.D.~~	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* Below method detection limit



Navy Sample # 602 Received 12/12/84

CLW

0000005647

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL293 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0218 #P602 1:50 dilution 12/1

METHOD NO. 624 DETECTION LIMIT 500 ug/lit

ANALYSIS DATE 12/13/84 when was actual sample taken

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	720 ~~N.D.~~	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	540 ~~N.D.~~
30V 1,2-trans-dichloroethylene	380* ~~N.D.~~	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* below method detection limit

Navy sc. p/e #P603 received 1, 12/84

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL292 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0219 #P603 12/12/84

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 12/13/84

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	7.0* ~~N.D.~~
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* below method detection limit

Navy sample HP608 received 12/ /84

CLW
0000005649

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 295 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0220 HP608 12/12/84

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 12/14/84

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	4.0* ~~N.D.~~	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	14 ~~N.D.~~
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	13 ~~N.D.~~
30V 1,2-trans-dichloroethylene	2.4* ~~N.D.~~	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* below method detection limit

Navy samp - HP634 received 12/ /84

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 296 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 02-0221 HP634 12/12/84

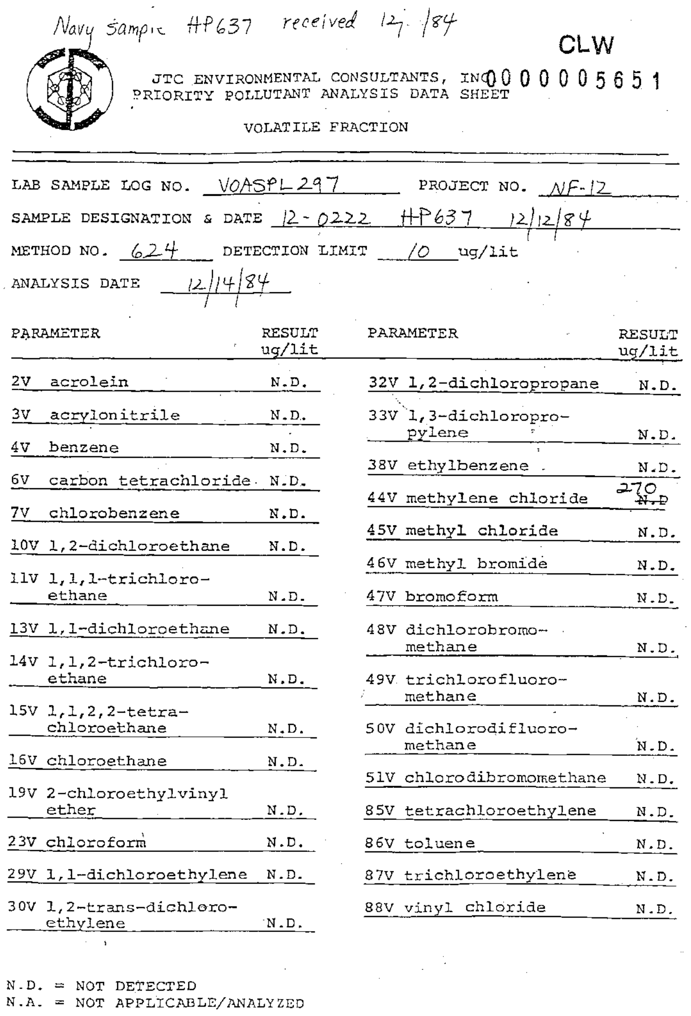
METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 12/14/84

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	130 ~~N.D.~~
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	2.3* ~~N.D.~~	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* below method detection limit



Navy sample HP637 received 12/ /84

CLW

JTC ENVIRONMENTAL CONSULTANTS, INC 0000005651
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 297 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0222 HP637 12/12/84

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 12/14/84

PARAMETER	RESULT ug/lit
2V acrolein	N.D.
3V acrylonitrile	N.D.
4V benzene	N.D.
6V carbon tetrachloride	N.D.
7V chlorobenzene	N.D.
10V 1,2-dichloroethane	N.D.
11V 1,1,1-trichloroethane	N.D.
13V 1,1-dichloroethane	N.D.
14V 1,1,2-trichloroethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.
16V chloroethane	N.D.
19V 2-chloroethylvinyl ether	N.D.
23V chloroform	N.D.
29V 1,1-dichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.

PARAMETER	RESULT ug/lit
32V 1,2-dichloropropane	N.D.
33V 1,3-dichloropropylene	N.D.
38V ethylbenzene	N.D.
44V methylene chloride	270 ~~N.D~~
45V methyl chloride	N.D.
46V methyl bromide	N.D.
47V bromoform	N.D.
48V dichlorobromomethane	N.D.
49V trichlorofluoromethane	N.D.
50V dichlorodifluoromethane	N.D.
51V chlorodibromomethane	N.D.
85V tetrachloroethylene	N.D.
86V toluene	N.D.
87V trichloroethylene	N.D.
88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

Navy samp #P642 received 12 '84

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL298 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0223 #P642 12/12/84

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 12/14/84

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	38 ~~N.D.~~
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

Navy sample HP Treated received |12/84

CLW

JTC ENVIRONMENTAL CONSULTANTS, INC. 000000565
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL299 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0224 HP Treated 12/12/84

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 12/14/84

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	1.8* ~~N.D.~~
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	30 ~~N.D.~~	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	2.3* ~~N.D.~~
30V 1,2-trans-dichloroethylene	2.3* ~~N.D.~~	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* below method detection limit

REPORT # 8
LABORATORY ANALYSIS ON
NAVAL SAMPLES
(A/E Contract N6270-84-B-6932
JTC REPORT # 84-129

PREPARED FOR:
DEPARTMENT OF NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VA 23511

PREPARED BY:
JTC ENVIRONMENTAL CONSULTANTS, INC.
4 RESEARCH PLACE, SUITE L-10
ROCKVILLE, MARYLAND 20850

DECEMBER 18, 1984

Ann E. Rosecrance
Ann E. Rosecrance
Laboratory Director

JTC Environmental Consultants, Inc.

Date 12/18/84 Report No. 8 to Naval Facilities Engineering Command, Norfolk, Virginia

JTC Data Report No. 84-129 Table 1 Date of Sample Receipt 12/14/84

NAVY SAMPLE ID	JTC SAMPLE ID	ANALYSIS PARAMETER							
		VOAs							
HP602 12/13/84	12-0225	see attached data sheets							
Bldg 20 12/13/84	12-0226								

Navy sample HP602 received 12/ , 84

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL302 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0225 HP602 12/14/84 1:5 dilution

METHOD NO. 624 DETECTION LIMIT 50 ug/lit

ANALYSIS DATE 12/14/84

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	230 ~~N.D.~~	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	12* ~~N.D.~~
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	340 ~~N.D.~~
30V 1,2-trans-dichloroethylene	230 ~~N.D.~~	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* below method detection limit

Navy samp. - Bldg 20 untreated rec ved 12/14/84

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOA SPL 300 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0226 Bldg 20 untreated 12/14/84

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 12/14/84

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	54 ~~N.D~~
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	10 ~~N.D.~~	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

0273

Mr. Price

UTILITIES BRANCH
Base Maintenance Department
Marine Corps Base
Camp Lejeune, North Carolina 28542

11330
MAIN
APR 8 1986

MEMORANDUM FOR THE FILE

Subj: RAW WATER WELLS, VOC CONTAMINATION DATE SECURED

1. The following dates were given to Mr. Bob Alexander on 8 April 1986 concerning shut down dates of following wells:

Well No.	Date Secured
✓602	30 Nov 84 ✓
✓601-660	6 Dec 84 ✓
✓608	6 Dec 84 ✓
✓634	14 Dec 84 ✓
✓637	14 Dec 84 ✓
✓651	4 Feb 85 ✓
✓652	8 Feb 85 ✓
✓653	8 Feb 85 ✓
✓TT-26	8 Feb 85 ✓
✓TT new well - TT-23	8 Feb 85 ✓
✓AS-4150	8 Feb 85 ✓
✓RR-~~217~~ (new well) 229	Never Ran ✓

2. These wells are the only wells secured for VOC's as of this date.

B. M. FRAZELLE, II

TT-25 - 1-14.87 ✓
045 - 1-13.87 ✓
As-106 - " ✓

0275

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511-6287

TELEPHONE NO.
(804) 445-1814
IN REPLY REFER TO:
5090
1143CFB

25 APR 1986

CLW

0000001475

U.S. Environmental Protection Agency
Attn: Arthur G. Linton, P.E.
Regional Federal Facilities Coordinator
Region IV
345 Courtland Street
Atlanta, GA 30365

Gentlemen:

In response to both your letter of February 3, 1986 and subsequent conversations between Jim Holdaway and Wayne Mathis of your office and Paul Rakowski and Cherryl Barnett of this office, we are enclosing all the analytical data from testing of the monitoring and potable wells at the Marine Corps Base, Camp Lejeune. Enclosure (1) is a preliminary report from NACIP Phase II initial sampling prepared by Environmental Science and Engineering, Incorporated (ESE). Enclosure (2) is the set of lab reports from sampling conducted by Camp Lejeune and analyses performed by our contract laboratory, JTC Environmental Consultants, Incorporated. The State of North Carolina also did some sampling and analyses; their reports are forwarded as enclosure (3).

Since much of the data is still in raw form, we would like to present a brief discussion of each enclosure to provide you with some background on the objectives of the investigation, the time frames involved, and the resulting actions that have been taken.

ESE is conducting the Phase II Confirmation Study at Camp Lejeune. This study is divided into three steps: verification, characterization, and development of feasible alternatives for remediation. The verification step is subdivided into three rounds of sampling. We believe that three rounds of data from groundwater and surface water samples are the minimum requirement for denying the existence of contamination and deleting a site from the NACIP program or proceeding with characterization and feasibility evaluation for the site. The contract for each step and round is independently negotiated; enclosure (1) is based on round one verification step sampling only. Since contamination has been verified in the Hadnot Point area, we are proceeding with the next two steps in the study. Round two verification step sampling as well as characterization and feasibility steps in the Hadnot Point area are currently being negotiated. We have enclosed a proposed milestone chart for these activities as enclosure (4).

Upon receipt of ESE's raw analytical data, a comprehensive sampling program for Volatile Organic Compounds (VOCs) was initiated at all potable wells and water treatment plants. This began in December of 1984 with sampling of wells in the Hadnot Point system. VOC analyses on all wells was completed by March 1985 and additional contamination was discovered in the Tarawa Terrace

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system. After confirmatory sampling of all wells showing VOC contaminants, 10 wells were shut down: 601, 602, 608, 634, 637, 651, 652, 653, TT-26, and TT-New. Since July 1985, Camp Lejeune has conducted weekly sampling of the finished effluent from the Hadnot Point and Tarawa Terrace plants and monthly sampling of TT-25, the closest operational well to the two contaminated wells in Tarawa Terrace. In addition, they collected another round of samples from the Hadnot Point wells in January 1986 and plan to sample all other wells for VOCs in the next month. No additional VOC problems have been discovered.

Additional samples and analyses conducted by the State of North Carolina included potable wells, treatment plants, and points in the Holcomb Boulevard and Tarawa Terrace distribution systems. The dramatic drop in VOC levels in the distribution system between February 8, 1985 to February 22, 1985 corresponds to the time the contaminated well 651 was shut down. As a quality control check, samples were split between JTC and the North Carolina laboratory on two occasions. These data have been compiled in enclosure (5).

The State conducted a separate investigation into the Tarawa Terrace contamination and concluded that a dry cleaner located off base is the likely source. We have not yet been provided a copy of their report or informed of any steps they will take to determine the extent of the contamination and to initiate remedial measures as required. Your support and coordination with the State on this matter would be appreciated to ensure that remedial measures are identified and implemented to prevent further contamination of Camp Lejeune's Tarawa Terrace well field. This well field is currently strained to meet water demand requirements and rapid groundwater cleanup is required.

We hope the enclosed information will alleviate any concerns you may have regarding the extent and sensitivity of our analytical procedures and the thoroughness of our investigation. Closure of the contaminated wells has eliminated detectable VOCs in the Hadnot Point and Tarawa Terrace distribution systems. We believe the well closures and the ongoing sampling of treatment plant effluents and operational wells are effective interim measures to minimize human exposure to hazardous substances and we are proceeding with a study to identify permanent solutions as part of the NACIP program. Other issues raised in your letter regarding analytical parameters for NACIP sampling and the National Priorities List were addressed in our letter of February 6, 1986.

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In a telephone conversation between Jim Holdaway, Cherryl Barnett, and Paul Rakowski of February 18, 1986, Mr. Holdaway suggested a review meeting at Camp Lejeune. We invite you to attend a briefing ESE will be giving at the start of additional confirmation study field activities. Our point of contact for the NACIP program, Cherryl Barnett, will let you know when the briefing is scheduled.

Sincerely,

J. R. BAILEY, P.E.
Head, Environmental Quality Branch
Utilities, Energy and Environmental
Division
By direction of the Commander

Encl:
(1) Evaluation of Data from First Round of Verification Sample Collection and
Analysis, Marine Corps Base, Camp Lejeune
(2) JTC Lab Reports
(3) State of North Carolina Lab Reports
(4) Milestone Chart
(5) Tarawa Terrace Water System, Comparison of Water Quality Data

Copy to: (w/encls (2), (3), (Summary Sheets only), (4), & (5)
MARCORB Camp Lejeune [redacted]
CMC (LFL)
CNO (OP-45)
COMNAVFACENGCOM

Division of Environmental Management (w/encls 1, 2, 4, & 5)
Attn: R. Paul Williams
Director
P.O. Box 27687
Raleigh, NC 27611-7687

Divison of Health Services (w/o encls)
Attn: Dr. Ronald H. Levine
Director
P.O. Box 2091
Raleigh, NC 27602-2091

Environmental Science and Engineering (w/encls 2, 3, & 5)
Incorporated
Attn: Mr. Russ Bowen
P.O. Box ESE
Gainesville, FL 32602-3053

SUMMARY OF JTC LAB REPORTS

Number	Date Issued	Sample Description
	12/18/84	HP-20 (1); potable wells in HP system
	12/18/84	potable wells in HP system; HP-20
	12/18/84	HP well 602; HP-20
	12/20/84	HP-20
	12/21/84	HP-20; FC-540 (distribution system)
	02/06/85	potable wells in HP system
(addendum)	02/19/85	HP well 636
	02/12/85	potable wells in other systems (including Tarawa Terrace (TT))
(addendum)	02/19/85	CHB new well
	02/14/85	potable wells in other systems
	03/08/85	potable wells; water treatment plants
	02/14/85	TT wells; TT WTP effluent
	03/18/85	WTP effluents; new wells
	03/01/85	TT wells; TT WTP effluent
	03/27/85	TT new well; TT WTP (samples taken before, during, and after pump tests on new well)
5	04/04/85	HP-20, TT effluent; wells LCH-4006 (2) & RR-227 (2)
6	04/26/85	HP-20, TT effluent
7	05/02/85	TT-39A (3)
	05/20/85	TT effluent; Well RR-227; TT-39A
7	06/07/85	Well AS-106 (2)
4	07/05/85	HP-20
6	07/05/85	HP-20
2	07/11/85	HP-20, TT effluents; Well TC-600 (2)
3	07/11/85	AS-110 (4), AS-2800 (distribution system)
7	07/11/85	HP-20, TT effluents
9	07/19/85	HP, TT effluents
1	07/29/85	HP, TT effluents
3	08/21/85	HP, TT effluents
0	08/21/85	HP, TT effluents
0	09/12/85	HP, TT effluents
2	09/18/85	HP, TT effluents
8	09/24/85	HP, TT effluents
1	09/24/85	HP, TT effluents

-20 is the Hadnot Point Water Treatment Plant (WTP).
ese wells were out of service when the other wells were sampled VOC
alysis was done on each well before it was brought back on line.
-39A (same as TT STT 39A) is the pump house that distributes Tarawa
rrace finished water. Sampling point is the same for TT WTP effluent.
-110 is the water treatment plant for the Marine Corps Air Station,
w River.

Encl (2)

SUMMARY OF JTC LAB REPORTS

Report Number	Date Issued	Sample Description
149	09/30/85	HP, TT effluents
153	10/03/85	HP, TT effluents
157	10/11/85	HP, TT effluents
161	10/17/85	HP, TT effluents
166	10/25/85	HP, TT effluents
171	10/31/85	Well TT-25
172	10/31/85	HP, TT effluents
175	11/07/85	HP, TT effluents
176	11/06/85	Well TT-25
180	11/14/85	Well TT-25
181	11/14/85	HP, TT effluents
183	11/27/85	HP, TT effluents
187	11/27/85	HP, TT effluents
191	12/04/85	Well TT-25
192	12/09/85	HP, TT effluents
199	12/18/85	HP, TT effluents
201	12/31/85	HP, TT effluents
208	01/02/86	HP, TT effluents
209	01/02/86	HP, TT effluents
214	01/21/86	potable wells, HP area
218	01/17/86	Well TT-25; HP, TT effluents
221	01/30/86	potable wells, HP area
226	02/20/86	Well TT-25; HP, TT effluents
229	02/25/86	HP, TT effluents
231	02/26/86	HP, TT effluents
237	02/28/86	HP, TT effluents
243	03/12/86	HP, TT effluents; Well TT-25
253	03/27/86	HP-20
261	03/27/86	HP, TT effluents
265	04/14/86	HP, TT effluents; Well TT-25

SUMMARY OF NORTH CAROLINA DIVISIONS OF
ENVIRONMENTAL MANAGEMENT AND HEALTH SERVICES LAB REPORTS

Report Date	Description
02/04/85	HP-20; Holcomb Boulevard (HB) distribution system (fed by HP-20)
02/08/85	HP-20; Building 670 (1); HB distribution system
02/22/85	TT new well; Well TT-26; TT WTP; HP WTP; HB WTP and distribution system
03/11/85	TT new well; Well TT-26; TT WTP
06/21/85	TT new well; Well TT-26; Well TT-25

(1) Building 670 is the HB plant.

Encl (38)

MILESTONE CHART

Milestone	Day
Government Issuance of Change Order	0
Submit POA&M and Safety/Contingency Plan for Characterization Effort	10
Government Approval of POA&M and Safety/Contingency Plan	17
Initiate Characterization On-Site Investigations for Hadnot Point Industrial Area	45
Initiate Round Two Sampling, Verification Step	45
Initiate Potable Well Sampling	45
Submit Report with Round Two Results, Potable Well Results	125
Return of Government Comments	155
Complete Characterization On-Site Investigation	260
Submit Preliminary Report with Hadnot Point Characterization Step Results	290
Return of Government Comments	320
Submit Characterization Step Draft Report for Hadnot Point	350
Submit Preliminary Feasibility Step Report for Hadnot Point	380
Return of Government Comments	410
Submit Feasibility Step Draft Report for Hadnot Point	440

TARAWA TERRACE WATER SYSTEM
COMPARISON OF WATER QUALITY DATA (ug/l)
SAMPLE DATE

Location	VOC Parameters	19 Feb (N)	19 Feb (L) (#37)	11 Mar (N)	11 Mar (L) (#44)
TT 26 Well	TCE	3.91	4.1		
	TetraCE	55.17	64		
	trans 1,2-DCE	trace	9.5		
	Benzene	ND	ND		
				Pumped 2 Hours	
TT New Well	TCE	53.53	ND	ND	1.3*
	TetraCE	26.17	ND	14.9	166
	trans 1,2-DCE	trace	13	ND	1.2*
	Benzene	ND	6.3	**	6.7
				Pumped 24 Hours	
	TCE			ND	2.4*
	TetraCE			40.6	488
	trans 1,2-DCE			ND	2.8*
	Benzene			**	4.3*
TT Finished Water				W/O New Well	
	TCE			ND	ND
	TetraCE			ND	ND
	trans 1,2-DCE			ND	ND
	Benzene			**	ND
				Upstream of Reservoir at 24 Hours	
	TCE			ND	1.1*
	TetraCE			21.3	20
	trans 1,2-DCE			ND	1.2*
	Benzene			**	2.2*
				Downstream of Reservoir at 24 Hours	
	TCE			ND	ND
	TetraCE			6.6	8.9*
	trans 1,2-DCE			ND	ND
	Benzene			**	1.6*

LEGEND

ND = Not Detectable at limit of 10 ppb.
TCE = Trichoroethylene
TetraCE = Tetrachloroethylene
trans 1,2-DCE = 1,2-trans-dichloroethylene
(L) = LANTNAVFACENGCOM Laboratory, JTC Environmental Consultants, Inc.
(N) = State of NC Laboratory
*Below method detection limit.
**State lab did not test for benzene.

Encl (5)

Danny DD info

ASSISTANT CHIEF OF STAFF, FACILITIES
HEADQUARTERS, MARINE CORPS BASE

DATE 5/2

TO:

[✓ BASE MAINT O] DIR, FAMILY HOUSING
[✓ PUBLIC WORKS O] DIR, BACHELOR HOUSING
~~COMM-ELECT O~~ BASE FIRE CHIEF
[✓ DIR., NAT. RESOURCES & ENV. AFFAIRS]

ATTN: ______

1. Attached is forwarded for info/~~action~~.

LANTDIV Response To E.P.A. on the N.A.C.I.P. study.

~~2. Please initial, or comment, and return all papers to this office.~~

Looks like June for next actio

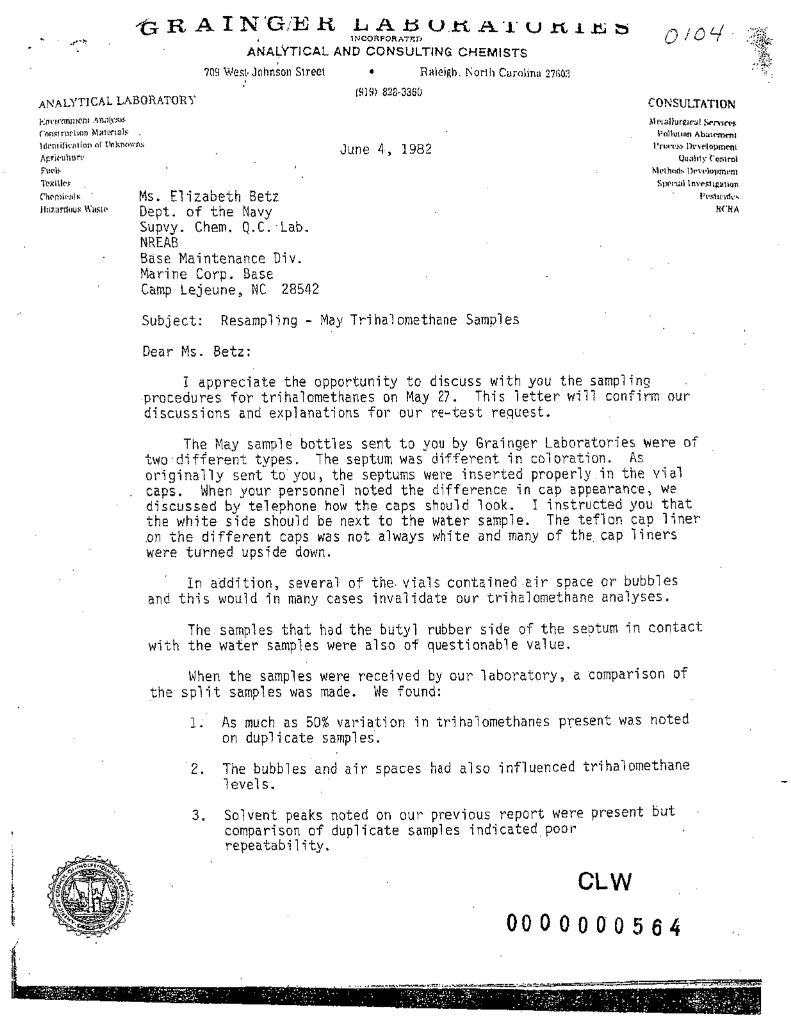
3. ~~Your file copy.~~

-Call if ?'s.

v/r
Bob

"LET'S THINK OF A FEW REASONS
WHY IT CAN BE DONE"

MCBCL 5216/21 (REV. 04-85)



GRAINGER LABORATORIES
INCORPORATED
ANALYTICAL AND CONSULTING CHEMISTS
709 West Johnson Street • Raleigh, North Carolina 27603
(919) 828-3360

0104

ANALYTICAL LABORATORY
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Identification of Unknowns
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Fuels
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Hazardous Waste

CONSULTATION
Metallurgical Services
Pollution Abatement
Process Development
Quality Control
Methods Development
Special Investigation
Pesticides
RCRA

June 4, 1982

Ms. Elizabeth Betz
Dept. of the Navy
Supvy. Chem. Q.C. Lab.
NREAB
Base Maintenance Div.
Marine Corp. Base
Camp Lejeune, NC 28542

Subject: Resampling - May Trihalomethane Samples

Dear Ms. Betz:

I appreciate the opportunity to discuss with you the sampling procedures for trihalomethanes on May 27. This letter will confirm our discussions and explanations for our re-test request.

The May sample bottles sent to you by Grainger Laboratories were of two different types. The septum was different in coloration. As originally sent to you, the septums were inserted properly in the vial caps. When your personnel noted the difference in cap appearance, we discussed by telephone how the caps should look. I instructed you that the white side should be next to the water sample. The teflon cap liner on the different caps was not always white and many of the cap liners were turned upside down.

In addition, several of the vials contained air space or bubbles and this would in many cases invalidate our trihalomethane analyses.

The samples that had the butyl rubber side of the septum in contact with the water samples were also of questionable value.

When the samples were received by our laboratory, a comparison of the split samples was made. We found:

1. As much as 50% variation in trihalomethanes present was noted on duplicate samples.
2. The bubbles and air spaces had also influenced trihalomethane levels.
3. Solvent peaks noted on our previous report were present but comparison of duplicate samples indicated poor repeatability.

In summary, the samples submitted have a poor reproducibility and reliability for analytical reporting purposes.

For these reasons, we strongly suggest your systems be resampled for the month of May. There will be no charge for the analytical work performed on the first set of May samples submitted to our laboratory. There also will be no charge for first set of sample bottles.

Please use the sampling procedure that I demonstrated to you and your personnel and I believe you will not capture bubbles in the sample vials. Also, the teflon side of the septum will be the hard side and the thinnest of the layers in the septum.

We appreciate your assistance and support in correcting this problem.

Very truly yours,

Michael C. Hargett
Vice President of Marketing

MCH:sb

0121

GRAINGER LABORATORIES
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ANALYTICAL AND CONSULTING CHEMISTS
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ANALYTICAL LABORATORY
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CONSULTATION
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Pollution Abatement
Process Development
Quality Control
Methods Development
Special Investigation
Pesticides
RCRA

August 10, 1982
82-4471

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Discussion:

Previously all samples from site TT and HP presented difficulties in performing the monthly Trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejuene personnel.

Results:

The identity of the contaminant in the well field represented by samples 206 and 207 was suspected to be Tetrachloroethylene. This was confirmed by two analytical techniques and the results were 76 μg/l and 82 μg/l for samples 206 and 207 respectively.. Sample 86 from May 27, 1982 was reanalyzed as a part of our study. Sample 86 was from site TT and contained 80 μg/l tetrachloroethylene.

Samples 208 and 209 were also analyzed by the same analytical techniques. The magnitude of the contamination was not as great as previously observed from this same sampling point. Upon reanalyzing sample 120 from site HP May 27, 1982 , Trichloroethylene was identified and quantitated at 1400 μg/l. A lesser amount of Tetrachloroethylene was confirmed at 15 μg/l. Samples 208 and 209 contained 19 μg/l and 21 μg/l Trichloroethylene respectively; Tetrachloroethylene was not detected.

Prior to this report, the samples from July 28, 1982 from site HP were analyzed. Traces of both solvents were found in this set. Though not quantitated, the level of Trichloroethylene seems to be in the range of that which was found in samples 208 and 209. The sample which showed the most contamination relative to the others was 205. Also sample 168 from site TT on July 28, 1982 was analyzed and shown to contain 104 µg/l Tetrachloroethylene.

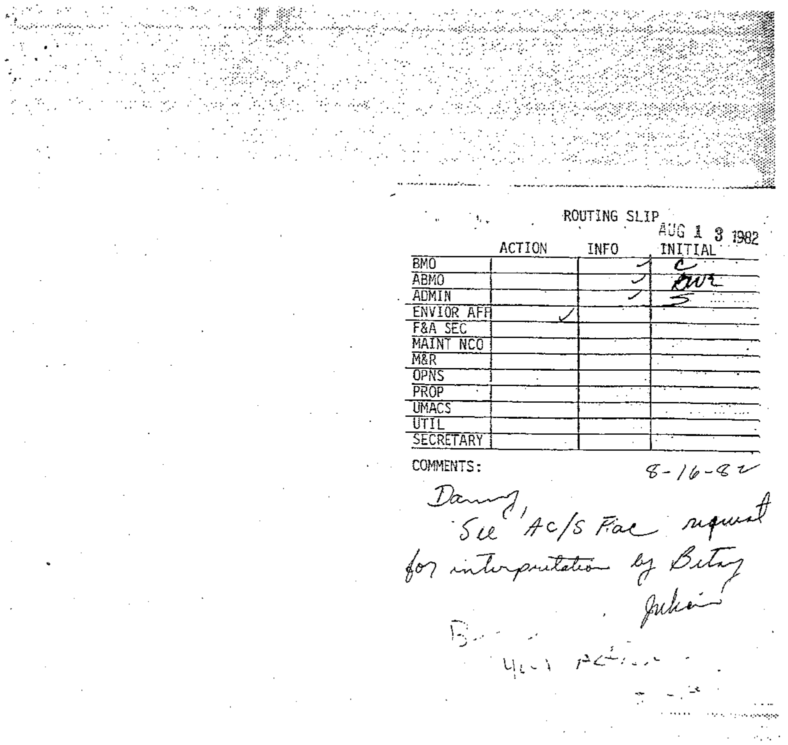
Conclusion:

Tetrachloroethylene was identified as the contaminant in the well field coded "TT". Its concentration seems relatively stable over the period in which it has been examined. It was confirmed that the well field coded "HP" has shown contamination by Trichloroethylene and Tetrachloroethylene. These levels have been variable over the per studied and are now at significantly lower levels than when first encountered. The following table summarizes the findings:

Sample	Date Taken	Site Code	Tri chloroethylene	Tetra-chloroethylene
206	7-27-82	TT	-	76
207	7-27-82	TT	-	82
86	5-27-82	TT	-	80
168	7-28-82	TT	-	104
208	7-27-82	HP	19	<1
209	7-27-82	HP	21	<1
120	5-27-82	HP	1400	15
205	7-28-82	HP	No Data	1.0

Bruce A. Babson
Bruce A. Babson
Chemist

BAB/ab
Customer #92400



ROUTING SLIP

AUG 1 3 1982

	ACTION	INFO	INITIAL
BMO		✓	c
ABMO		✓	DWR
ADMIN		✓	S
ENVIOR AFF	✓		
F&A SEC			
MAINT NCO			
M&R			
OPNS			
PROP			
UMACS			
UTIL			
SECRETARY			

COMMENTS: 8-16-82

Danny,
See AC/S Fac request for interpretation by Betsy
Julian

B[illegible]
your action [illegible]

ASSISTANT CHIEF OF STAFF, FACILITIES
HEADQUARTERS, MARINE CORPS BASE

DATE 13 Aug 82

TO:

[✓ BASE MAINT O]
PUBLIC WORKS O
COMM-ELECT O
DIR, FAMILY HOUSING
DIR, UNACCOMPANIED PERS HSG
BASE FIRE CHIEF

ATTN: LT Col. Catta

1. Attached is forwarded for info/action.

Ron.

2. Please initial, or [✓ comment], and return all papers to this office.

Request you have your chemist provide "lay-man" interpretation of findings. Thank you.

3. Your file copy

Fitz

"LET'S THINK OF A FEW REASONS
WHY IT CAN BE DONE"

MCBCL 5216/21 (REV. 2-81)

0126

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

1. On 6 May 1982, Mike Hargett, of Grainger Labs, called and informed me that on 3 May 1982, while they were analyzing the first set of Trihalomethane samples received from us, interferences possibly from chlorinated hydrocarbons hindered analysis of samples from two systems, Tarawa Terrace and Hadnot Point.

2. It was determined that raw and treated samples from the treatment plants for the two systems would be taken for analysis of the interferring chlorinated hydrocarbons. On 28 July 1982, a raw water sample, #206, and a treated water sample, #207, were taken at the Tarawa Terrace water treatment plant. A raw water sample, #208, and a treated water sample, #209, were taken at the Hadnot Point water treatment plant, on 28 July 1982. The Trihalomethane samples for July were also taken on 28 July 1982, for these two systems. In Grainger's letter, of 10 August 1982, they erroneous report the samples sas taken on 27 July 1982, they were collected and shipped on 28 July 1982.

3. Analysis of the above samples and some Grainger had preserved showed that in the Tarawa Terrace water treatment plant and system, the interferring chlorinated hydrocarbon is tetrachloroethylene, or otherwise known as perchloroethylene. Tetrachloroethylene is used as a dry cleaning and degreasing solvent, and heat-transfer medium, Analysis of the Hadnot Point water treatment plant and system samples showed Trichloroethylene and low levels of tetrachloroethylene. Trichloroethylene is used primarily as a metal degreaser. It is also used as a dry-cleaning solvent and a type of pesticide, fumigant.

4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

5. Tetrachloroethylene, in high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for tetrachloroethylene are 2300 ug/l for 1-day, 175 ug/l for 10-days, and 20 ug/l for longer-term where drinking water is the only source of exposure. On 9 April 1980, EPA came out with a Suggested Action Guidance on Tetrachloroethylene. This guidance was a result of possible tetrachloroethylene contamination of drinking water

OLW

where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/1 (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/1 (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/1.

6. Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethanes), at high levels , has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for trichloroethylene were determined to be 2 mg/1 for 1-day, 0.2 mg/1 for 10-day, and 75 ug/1 for a chronicsnarl. There is no Suggested Action Guidance on trichloroethylene.

7. Below is a table of the results received from Grainger Labs.

				_chloroethylene, ug/1	
Sample #	Sample Date	WTP	Sample Site	Tri-	Tetra-
86 168	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data	100
208	7-28-82	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

8. The level of tetrachloroethylene for the Tarawa Terrace system samples averaged 0.09 mg/1, which exceeded the recommended level of 0.04 mg/1. The levels do not vary significantly between the raw and treated samples. The raw and treated samples were taken at the plant where the water had already traveled some distance in pipes. Therefore, with no significant difference between raw and treated samples and the high average of 0.09 mg/1, I would believe the tetrachloroethylene contamination is possibly do to the use of coated A/C pipe in the raw water lines at Tarawa Terrace.. Tetrachloroethylene, in the Hadnot Point system samples is at trace levels and well under recommended levels.

9. The level of trichloroethylene, at Hadnot Point, is presently averaging 20 ug/1, which is below all three recommended snarls; 1-day, 10-day, and chronic. No explaination is offered for the 1400 ug/1 level on 27 May 1982, or why it is now averaging only 20 ug/1.

Elizabeth A. Betz
Elizabeth A. Betz
Supervisory Chemist

Special Testing of
TT + HP plants for
Trichloroethylene + Tetrachloroethylene
Both within limits. Recommend
Sending Data to Plant Div.

ATSDR Record of Activity

UID #:____ Date: June 22, 1993 Time: 1:00 pm

Site Name: Marine Corps Base Camp Lejeune (MCBCL) City: Jacksonville Cnty: Onslow State: NC

CERCLIS #: ____________ Cost Recovery #: 405E Region: IV

Site Status (1) X NPL Non-NPL RCRA Non-Site specific X Federal

Activities

Incoming Call Public Meeting* Health Consult* Site Visit* X Outgoing Call X Other Meeting Health Referral
Info Provided

Contacts and Affiliation

(27) Neal Paul, EMD, IRP Director
(27) Ray Wattras, Baker Environmental
(27) Linda Berry, NAVFAC, LantDiv
(27) Tom Morris, EMD, IRP
(27) Dr. Tom Hager, MCBCL acting superintendent of schools
See also attached TRC attendance list.

1-EPA	2-USCG	3-OTHER FED	4-STATE ENV	5-STATE HLT	6-COUNTY HLTH	7-CITY HLTH
8-HOSPITAL	9-LAW ENFORCE	10-FIRE DEPT	11-POISON CTR	12-PRIV CITZ	13-OTHER	14-UNKNOWN
15-DOD	16-DCE	17-NOAA	18-OTHR STATE	19-OTHR COUNTY	20-OTHR CITY	21-INTL
22-CITZ GROUP	23-ELECT. OFF	24-PRIV. CO	25-NEWS MEDIA	26-ARMY	27-NAVY	28-AIR FORCE
29-DEF LOG AGCY	30-NRC	31-ATSDR				

Program Areas

X Health Assessment _ Health Studies _ Tox Info-profile _ Worker Hlth _ Petition Assessment _ Health Surveillns _ Tox Info-Nonprofit _ Admin

Narrative Summary:

Carole Hossom and I were requested by EPA to attend the TRC meeting at MCBCL. Prior to the meeting, we talked to Mr. Morris and Mr. Paul about getting copies of IR reports. We showed Mr. Paul the proposed completed exposure pathways that we were developing based on the limited data and information that we have received (latest document 9/90). Ms. Hossom explained the public health assessment process and the reasons why we developed the completed pathways. Mr. Paul asked Mr. Morris to get the information to us. Mr. Paul also asked Mr. Morris to contact the Environmental Planning Division to get us a copy of the sampling data/report of all potable wells that was done 12/92. Mr. Morris would also get up a copy of the lead sampling report from the Facilities Division. Previous requests in writing and by telephone have not produced any additional information, so far. We asked Mr. Morris several questions to fill in data and information gaps.

The TRC meeting focused on the planned public meeting that evening for Site 48, MCAS Mercury Dump, and progress on RI/FS at Site 2, 6, 9, 21, 24, 78, and 82. The Navy plans to make Site 48 a no action site because they have not been able to find any significant contamination in any media; fish and crabs samples were not contaminated with mercury. EPIC historical photos do not reveal any additional areas of stressed vegetation; identified stressed area were tested. EPA and state appear to agree with the Navy; I am not sure the county does.

Both MCBCL EMD and LANTDIV stated that ATSDR were now on the mailing list for documents. We also received a base phone book. A list of questions concerning data gaps was left with Ms. Berry and Mr. Paul.

Significant revelations (by Mr. Wateras:
1. Contamination has migrated to the deep aquifer in OU1 (HPIA) and OU2; TCE and 12DCE at "high levels:".
2. Wallace Creek is currently posted; we say no fishing signs. Fish samples contaminated with TCE, pesticides, PCBs; VOC's in 15-20 ppb range. There is a large alligator in Wallace Creek.
3. Removing of several buried canisters and drums of fuel and fuel oil will be removed. Buried ordnance casings were discovered.

4. OU4, which includes Site 69 Chemical Dump, surface water and sediments were "clean"; fish and benthic data were not available yet.
5. OU5 (Site 2, Former Day Care). We visited the site. The Navy will remove the highly contaminated soil (10 - 2500 mg/kg DDT,DDE,DDD). That area is not fenced (Ms. Hossom asked the question). Former playground area was also sampled, but he did not know the results. We noticed a picnic table on the opposite side of the building from the known contamination; area had grass cover and trees.
6. ATSDR asked if fish pond at OU7 Site 28 (former HP Burn Area) and surface soils were to be tested; Mr. Wateras said yes. There are alligators in the pond.
7. We got school enrollment for the 8 schools on MCBCL, and the date when each school was built.

None of our observations or none of the information provided to us would change any of the pathways developed to date.

Action Required/Recommendations/Info Provided:
1. I called Yvonne Walker, NEHC, and asked her to check if the U.S. Army Technical Escort Unit (TEU) had any contingency or emergency plans in the event of a release while doing Site 69 investigation.
2. I also asked Ms. Walker to find out why delay lines for a radar unit used mercury.
3. Call county health and get their input on MCBCL IR program.

Signature: ______________ Date: June 22, 1993

cc: Diane Jackson, Carole Hossom

Enclosures: Yes (x) No ( ); MIS entered: Yes ( ) No (x)

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

DEHNR

RECEIVED
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ATSDR

December 8, 1994

Mr. Max M. Howie, Jr.
Chief, Program Evaluation, Records,
and Information Services Branch
Agency for Toxic Substances and Disease Registry
1600 Clifton Road (E-56)
Atlanta, Georgia 30333

RE: Public Health Assessment for U.S. Marine Corps Base Camp Lejeune, Jacksonville, North Carolina, Dated September 8, 1994.

Dear Mr. Howie:

The referenced report has been reviewed by the NC Superfund Section. Our comments are attached. We apologize for the late submittal of these comments, however we did not receive the document until November 14, 1994. Thank you for providing us an opportunity to review this assessment. If you have any questions about this, please call me at (919) 733-2801.

Sincerely,

Patrick Watters

Patrick Watters
Environmental Engineer
Superfund Section

Attachment

cc: Jack Butler
Neal Paul - MCB Camp Lejeune
Linda Saksvig, P.E. - LANTDIV
Katherine Landman - LANTDIV

Comments on the
Public Health Assessment (PHA)
for the
U. S. Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

1. General - Available Information
   The intent of this report is to provide a comprehensive health assessment of the Camp Lejeune Marine Corps Base. Camp Lejeune has been on the National Priorities List since November 1989 and as a result, a wealth of data and information is available regarding the health and environmental impacts of the various sites. Because this document is to be used by the general public, it is imperative that appropriate, up to date resources be used to generate a technically accurate document that communicates the risks in a responsible manner.

   A review of the References listed at the back of the document (pages 50-52), reveals that the vast majority of the NPL related documents were not used in the preparation of this report. There are only 5 references cited (3, 15, 25, 38, and 39) that are NPL documents related to Camp Lejeune. Three of these are summary type documents that do not include significant amounts of data (documents 3, 38, and 39). The other two documents are Remedial Investigation Documents specific only to Site 2 and Sites 6,9, and 82 (documents 15 and 25).

   The concern here is that there is information essential to this health assessment that apparently was not considered. Several comments below regarding incorrect conclusions could have been avoided had these NPL documents been reviewed. These documents are in the public domain and are available from EPA, Camp Lejeune and the State of North Carolina.

2. Page 1, Summary
   The second paragraph indicates that "previously accepted" hazardous material handling and disposal methods led to environmental contamination at several areas on base. This may be misleading to the general public in that it implies that there has always been some degree of State and/or Federal agency concurrence. Camp Lejeune was in existence long before there were any significant environmental regulations or standards to define "accepted" methods.

3. Page 1, Summary
   The next to the last paragraph on this page states that there is a "...widespread problem with lead leaching from faucets or water pipes..." Page 12 of the PHA states that "They found no buildings with lead piping..." This report needs to be

changed to indicate that the source of the lead is from the solder used to connect the copper service lines and not from lead faucets or pipes. (see also comment 4)

4. Page 9, Table 1
   This comment is like # 3 in that the source of lead contamination is said to be from "lead plumbing" which is misleading if the source is actually the lead solder used for the copper pipes as stated on page 12.

5. Page 16, 4th Paragraph
   This paragraph should be changed to indicate that the pesticide contaminated soils at Site 2 have been removed.

6. Page 17, 1st Paragraph of Lawn-Care Workers
   The exposure scenario for lawn care workers at Site 2 assumes that the grass is cut three days per week. This is conservative by at least a factor of three and should be clearly indicated as such in the discussion.

7. Page 25, 1st Paragraph
   This paragraph states in part that "...cancerous health effects are unlikely; however, not enough scientific information is available to definitely rule out the possibility of cancerous health effects from low dose exposure to VOCs...". This is potentially misleading to the general public because it implies that the concept of zero risk is obtainable if enough scientific information is made available. Risk assessment is a mathematical operation that can be zero only if the contaminant levels are zero or the exposure time is zero. It is imperative that the health risks be communicated responsibly so that the affected public can make informed rational decisions.

8. Page 26, Table 3
   Please reference the source of the Drinking Water Standards shown in this table. Also note that there are drinking water and groundwater standards which may not be the same.

9. Page 28, 5th Paragraph
   Same as comment 7 regarding risk communication.

10. Page 30, Table 4
    The last column on the right hand side indicated that there is no increase in the cancer risk for the adult scenario for VOC exposures. This is inappropriate risk communication as well as being inconsistent with previous statements regarding cancer risks due to VOCs (see comments 7 and 9).

11. Page 32, Summary and Follow-up Paragraph
    This paragraph states that "existing" data for Site 48 has not been provided for review. The PHA does not elaborate on what this "existing data" is however there is considerable data on Site 48 in the Remedial Investigation Report which has been in

final form and in the public domain since June 1993. The other concern is why was this PHA issued for comment before all of the data was reviewed? See the general comment regarding document references.

12. Pages 33 and 34 (Sites 6, 9, and 82)
This discussion needs to be revised to reflect the fact that Wallace and Bearhead creeks were resampled and the results are currently being reviewed by the State of North Carolina with regard to the need to issue a fish consumption advisory. See the general comment regarding document references.

13. Page 35, Section III - No Apparent Health Hazards
The report concludes that Sites 43, 69 and 28 have no apparent health hazard. While there is some data on these sites, none of these are at the Final RI Report stage. None of the existing data reports on these sites were cited in the reference list therefore the basis for this conclusion is unclear. See also the general comment on document references.

14. Page 35, Section IIIB
The description of Site 69 indicates that beta radiation sources were disposed of on this site. The Remedial Investigation Work Plan prepared for this site does not mention any radiation hazard on this site.

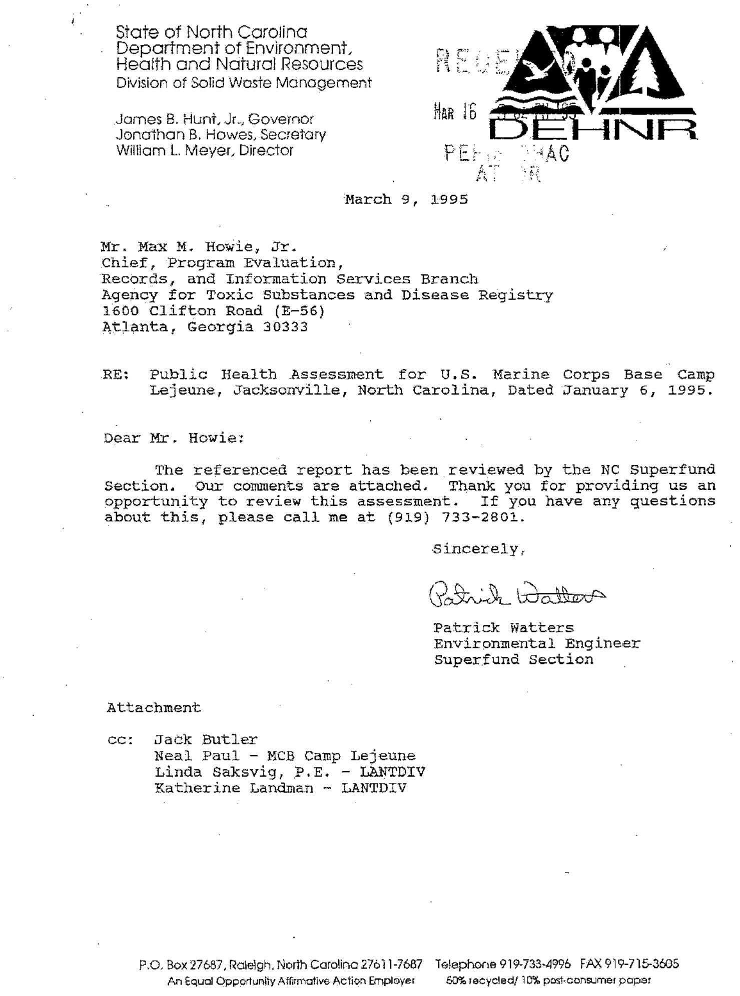
15. Page 36, Section IV - No Health Hazard
See comment # 13 regarding the fish contamination at Site 28.

16. Page 44, Planned Action # 1
The PHA should indicate that the pesticide contaminated soils at Site 2 have been removed.

17. Page 45, Planned Action # 1 for Groundwater Contamination
This states that "No additional actions are being planned at this time." This statement is incorrect. There are many actions to address groundwater contamination that are at various levels of completion. See the general comment regarding document references.

18. Page 46, Planned Action # 1 for Fish Contamination
Supplemental sampling has been performed for Wallace and Bearhead creeks. See comment # 10 and the general comment on document references.

19. Page 47, Planned Action # 1 for Soil Contamination at Site 69
This section states that "No additional actions are planned at this time. This is incorrect. This area has been assessed and the data and proposed remedial actions are currently under review. See the general comment regarding document references.



State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

REGE
MAR 16
PEH [illegible] HAC
AT [illegible] R

DEHNR

March 9, 1995

Mr. Max M. Howie, Jr.
Chief, Program Evaluation,
Records, and Information Services Branch
Agency for Toxic Substances and Disease Registry
1600 Clifton Road (E-56)
Atlanta, Georgia 30333

RE: Public Health Assessment for U.S. Marine Corps Base Camp Lejeune, Jacksonville, North Carolina, Dated January 6, 1995.

Dear Mr. Howie:

The referenced report has been reviewed by the NC Superfund Section. Our comments are attached. Thank you for providing us an opportunity to review this assessment. If you have any questions about this, please call me at (919) 733-2801.

Sincerely,

Patrick Watters

Patrick Watters
Environmental Engineer
Superfund Section

Attachment

cc: Jack Butler
Neal Paul - MCB Camp Lejeune
Linda Saksvig, P.E. - LANTDIV
Katherine Landman - LANTDIV

Comments on the
Public Health Assessment (PHA)
for the
U. S. Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

1. General - Available Information
This is basically the same comment that was made on the previous version of this document. Camp Lejeune has been on the National Priorities List since November 1989 and as a result, a wealth of data and information is available regarding the health and environmental impacts of the various sites. A review of the References listed at the back of the document still appears to indicate that the vast majority of the NPL related documents were not used in the preparation of this report. These NPL documents are in the public domain and are available for review.

2. Page 43, Site 43
Some of the information in the "Conclusions", "Completed Action", and "Planned Actions" is not consistent with the documentation we have on Site 43. For example:
   - According to the schedule given in the Work Plan for site 43 (Operable Unit 6), the RI field work will not be completed until April. The RI Report is not expected to be finalized until the first quarter of CY 1996. The Final Proposed Remedial Action Plan is not expected until July of 1996.

3. Page 49, Site 28
Some of the information provided in the "Conclusions", "Completed Action", and "Planned Actions" is not consistent with the documentation we have on Site 28 (Operable Unit 7). For example:
   - The RI Report is still in review and has not been finalized. Also, the Proposed Remedial Action Plan and Record of Decision have not even been issued in draft form for comment.

07.01-01/21/97-01866 Partnering ARF ✓

Baker

Baker Environmental, Inc.
Airport Office Park, Building 3
420 Rouser Road
Coraopolis, Pennsylvania 15108

(412) 269-6000
FAX (412) 269-2002

January 21, 1997

Commander
Atlantic Division
Naval Facilities Engineering Command
1510 Gilbert Street (Building N-26)
Norfolk, Virginia 23511-2699

Attn: Ms. Katherine Landman
Navy Technical Representative
Code 18232

Re: Contract N62470-89-D-4814
Navy CLEAN, District III
Contract Task Order (CTO) 0001
MCB Camp Lejeune, North Carolina
Partnering Minutes - November 1996

Dear Ms. Landman:

Attached are the final meeting minutes for the Partnering meeting held on November 6 and 7, 1996 at MCB Camp Lejeune, North Carolina.. A copy of these meeting minutes has been forwarded to all of the Team members. These meeting minutes were finalized at the next Partnering meeting held on January 6, 7, and 8, 1997 in Clearwater Florida. Revisions to these minutes include discussions on the Phase I investigation findings for Operable Units Nos. 15 and 16 and the Treatability Study for Operable Unit No 10.

If you have any questions, please do not hesitate to contact me at (412) 269-2053.

Sincerely,

BAKER ENVIRONMENTAL, INC.

Matthew D. Bartman

Matthew D. Bartman
Activity Coordinator

MDB/lq

Attachments

cc: Ms. Linda Saksvig, P.E., Code 18231
Mr. Byron Brant, Code 1832
Mr. Neal Paul, MCB Camp Lejeune
Mr. Dave Lown, NCDEHNR
Ms. Gena Townsend, EPA Region IV
Mr. Jim Dunn, OHM
Mr. Brent Rowse, ROICC MCB Camp Lejeune
Ms. Lee Anne Rapp, P.E., Code 18312 (w/o attachment)
Ms. Beth Collier, Code 02115 (w/o attachment)

MEETING MINUTES
MCB CAMP LEJEUNE PARTNERING TEAM
NOVEMBER 6 and 7, 1996

A Partnering Meeting was conducted on November 6 and 7, 1996 between representatives from LANTDIV, MCB Camp Lejeune, USEPA Region IV, NC DEHNR, Baker Environmental, Inc. (Baker), and OHM Remediation Services, Inc. (OHM). The meeting was attended by the following:

- Ms. Katherine Landman, LANTDIV
- Mr. Neal Paul, MCB Camp Lejeune
- Ms. Gena Townsend, USEPA
- Mr. Dave Lown, NC DEHNR
- Mr. Matt Bartman, Baker
- Mr. Richard Bonelli, Baker
- Mr. Jim Dunn, OHM

Guests who attended the meeting included:

- Mr. Bill Mullen, LANTDIV
- Mr. Mark Barnes, LANTDIV
- Mr. Mick Senus, MCB Camp Lejeune
- Mr. Tom Morris, MCB Camp Lejeune
- Mr. Dan Bonk, Baker
- Mr. Tom Trebilcock, Baker
- Mr. Dan Fisher, Baker

The meeting was hosted by Mr. Neal Paul and chaired by Mr. Jim Dunn. Additionally, Matt Bartman recorded the minutes.

The minutes are summarized below for each day of the meeting and by topic.

November 6, 1996

The meeting focused on the following items:

- Team Member Schedules
- Groundwater Modeling
- Base Master Plan
- Lot 201 Storm Water Pond Project
- Land-Use Restrictions
- RAB
- OU 15 and OU 16 update

November 7, 1996

- Long-Term Monitoring
- Site 41 Update
- Site 35 Treatability Study Update

The first day of meeting began with the check in and review of the minutes from the previous meeting. Jim provided minor revisions to the minutes. The final minutes from the July Partnering Meeting will be finalized and distributed to all the team members.

During check in the following important matters were discussed:

Neal let the Team know the Lt. Cheryl Hansen is no longer serving at the ROICC. Her position is know being handled by Brent Rowse who used to report to Neal while he was at EMD. Neal informed the Team that Tom Morris would be leaving as of December 2, 1996 for a nine month tour of duty. Due to Neal's shortness of staff, Jennifer Casey and Marliyn Brower have been added. Neal informed the Team that he is acting as the Tier II link for the Marine Corps in SOUTHDIV.

Mark Barnes informed the Team the LANTDIV Code 18 is looking at realignment. The UST NTRs will be reassigned to IR sites due to the decreasing number of UST sites. All UST construction work will no longer be completed by J. A. Jones, OHM is now contracted for this purpose.

Dave informed the Team that his duties prior to taking over for Patrick have not been relinquished. Therefore, he is still serving dual responsibilities. Due to personal matters with the individual responsible for hiring, Dave is unsure when this will be resolved.

Gena informed the Team that she is no longer working on Cherry Point and that she has been assigned to Pensacola. She will be working with the CLEAN contractor ENSAFE.

Schedules

Matt explained that it would be beneficial to know each Team members schedule for the month so that if a conference call needed to be scheduled or that person need to be contacted the rest of the Team would know if it could be done or when the next available date would occur. Matt said that he would take responsibility for gathering all of the Team schedules and providing a combined calendar.

Groundwater Modeling

Dan Fisher from Baker Environmental provided the Team with an update regarding the groundwater modeling being conducted for the base. Dan started off by stating that the comments on the BRAGS study have been addressed. This study was not provided to USEPA or NC DEHNR until the draft version could be reviewed by USGS.

Jim provided some input regarding the Lot 203 Pump and Treat System. The plant has been in operation for the last 2 to 3 months and last month it was down a total of six hours. The shallow aquifer/shallow wells are pumping at 13 gpm from a total of six wells. Jim stated that we need to look at relocating wells No. 5 and No. 6. The deep wells are pumping between 30 and 130 gpm. Dan Fisher confirmed that the model and wells for the surficial need examined. Jim stated that OHM may shut off shallow wells if they are not functioning for what they were designed to do.

During his update on the BRAGS, Dan informed the Team that the BRAGS study was used as a starting point for the Site 82 and Site 73 models. The model for Site 73 has shown that the contamination will enter Courthouse Bay and that contamination will not migrate under the Bay. Additionally, the model has demonstrated that pumping wells have no impact on the migration of contamination. Dan mentioned that one of the problems that he is having with the model is input data for historical information. It is unknown where the source was and how long ago the contamination began. If this information is available it will assist in determining how long contamination has been moving and when it will reach Courthouse Bay.

Neal stated that Dan could contact John Cotton at x5003 for history. Additionally, Neal informed the Team that in the next five years the southern tip of the Courthouse Bay area is going to be developed for riverain operations which will consist of multiple piers and approximately 60 to 70 boats.

Dave explained that we need to determine the Lethal Quantity (LQ10). Dave also mentioned that if pump and treat is the selected remedy for this site it will not be a remediation but a containment. Additionally a lot of money will be spent defining the plume then monitoring it.

Kate was interested in the schedule for all of the modeling. Dan explained that the BRAGS should be completed in approximately a five week time frame. However, Bill Mullen felt that because the site date from Site 73 is needed for the BRAGS it would be cost-effective to complete the model for Site 73 to support a non-FS. The information in the model could be used to create supporting data for intrinsic remediation. Bill also explained that current model examines the groundwater to surface water pathway if surface water mixing is required additional time will be needed for the modeling.

Dave cautioned that a risk-based approach does not stop the removal or treatment of source areas and that degradation rates will need to be considered.

Gena and Dave granted permission to relax the schedule on the ROD for OU No. 9 so that this modeling effort could be conducted.

Dan continued the modeling discussion with the modeling that was conducted for OU No. 1 specifically Site 22 which is also know as the Fuel Farm at Hadnot Point. Based on information from Catlin, Dan explained that 800,000 gallons had been lost and 500,000 gallons had been recovered. Dan mentioned that benzene is now in the deeper portion of the aquifer. This migration is due to a downward head plus the influence of the pumping wells and no upward gradient. Bill mentioned that the groundwater flow is based on groundwater measurements. It is known that the fuel farm is definitely the source of this contamination. Dan also explained that there is sufficient wells for product recovery, however, the wells are just insufficient in recovering product. This potentially, is due to the placement of the wells being used for recovery.

Base Master Plan

Neal informed the Team that the Facilities Department prepares the Base Master Plan (BMP) every five years. This years sites that have institutional controls as part of the RODs will be specified in the BMP. The plan to ensure that this takes place is that when a ROD is signed a form is sent from EMD to Facilities Planning stating the institutional controls are being enforced at the site. When the draft BMP is published Neal will provide the Team members with a copy of the text for these sites for review and comment. Neal stated that there are no plans to build any residential housing in the next 15 years, however, areas for recreation are in the plan. Prior to any building being constructed the Environmental Impact Work Group, which includes a representative from the IR Program, evaluates the area where construction is to be completed and provides input regarding potential risks to the environment and human health.

Gena mentioned that if land use restrictions are made that the appropriate individuals should be notified and told what enforcement actions there are if the restrictions are not complied with. Dave stated that the state of North Carolina views an IR site as a SWMU. Gena mentioned that if IR sites are in current RCRA permit there will have to be a permit modification to list sites as no further action or describe what type of action is being conducted.

Dave had a concern that there is nothing in the BMP to inform the State as to what Camp Lejeune is doing at a site that is either under RCRA or a listed IR site. Neal said he would proceed with getting the IR sites published in the BMP and that the enforceability would be handled under RCRA because the entire base is considered a SWMU.

Lot 201 Projects

Neal and Tom explained the project that is currently being completed in the area of Lot 201. To support the landfill currently being constructed on the eastern side of Piney Green Road three storm water ponds need to be constructed on the western side of Piney Green Road to handle water from three storage areas. The construction of these areas are to store wood waste, concrete and debris, and solid waste so that it would not be placed in the landfill. Baker has conducted wood clearing and a geophysical investigation in three areas identified by the Activity. However, two areas, that would be used for the Ponds 1 and 2, were determined to be unsuitable based on the geophysical investigation findings. The third area although suitable from a geophysical standpoint is unsuitable due to shallow groundwater contamination detected during the RI conducted at Lot 201.

Jim asked where the water in the ponds would be diverted to. Neal stated that a discharge design had not been completed. Rich wanted to know if the Activity planned for any additional geophysical investigations to be conducted in the area. Additional work will need to be completed and will be performed by Baker or by construction contractor. Tom stated that there is a possibility that one pond may be eliminated and a second enlarged. Gena and Dave expressed concern with constructing in this area if there is something in the ground that was going to be covered up. Would like to see test pits due to see what the geophysical investigation is indicating. This information will be discussed with the individuals in charge of construction so that appropriate action can be taken.

Land Use Restrictions

Kate would like to see land use restriction text removed from future RODs. The text should only refer to aquifer use restrictions. For future sites where soil is not a problem only aquifer use restrictions should be considered and mentioned in the ROD. However, if subsurface soil is determined to be a problem land use restrictions will need to be considered.

RAB

Tom informed the team regarding Environmental Justice which requires that during the formation of a RAB that a concentrated effort has to be made to enlist a representative for minority representation. It is felt that the recruitment process must be tailored so that the minority community is made more aware of the RAB and that extra efforts are used to establish their representation. The Team came up with several suggestions as to how this could be accomplished and Neal said that he would discuss it with the community RAB members at the meeting planned for the evening. A decision as to how to recruit minority members would be decided upon at the meeting.

OU No.15 and OU No. 16 Update

Matt provided the Team with an update pertaining to the Phase I investigations conducted at these OU No. 15 (Site 88) and OU No. 16 (Sites 89 and 93). Phase I investigations were conducted at these sites using temporary wells to assist in delineating shallow and intermediate depth groundwater contamination. Matt used figures that will be provided in the Phase I investigation report to describe the extent of the contamination at all of the sites. The information provided in the Phase I investigations is to be used to scope the investigation needs for Phase II of the investigation.

Matt indicated that the contamination at Site 88 has impacted both the shallow and intermediate depth. Groundwater flow appears to be in the direction of the New River. However, the highest levels of contamination in the intermediate depth were detected in MW08, which is opposite groundwater flow. Jim mentioned that with levels this elevated that there is possibly another source. The Cobler Shop (Building 43) northeast of the Building 25 could be a potential source. Matt said that Baker would look into the activities conducted in the building and the geology that may influence groundwater flow in this direction. However, analytical findings from shallow and intermediate wells installed northwest indicate that the contamination has been defined in this direction.

Matt explained that the contamination at Site 93 has been well defined in both the shallow and deeper depths. The NC WQS were used as limits for bounding the contamination. It was demonstrated during the Phase I investigation that the east, west, north, and south directions of the contamination were defined.

However, Site 89 is probably the most interesting of the three sites. This site which was a former motor pool and now serves as the location of the DRMO has some problems. Within the fenced area of the DRMO the contamination is limited to the shallow portion of the aquifer (less than 25 feet). When the investigation continued to the east of the right of way the contamination was found in the intermediate portion of the aquifer (25 feet to 40 feet). Additionally, surface water and sediment samples collected from Edwards Creek indicated levels of solvents also detected in the groundwater. Unfortunately due to the lack of funding and time the contamination to the east of the site could not be fully delineated.

After a brief discussion by Team members regarding funding and the schedule to complete the Phase II investigations at these sites the following action items were undertaken be Baker and OHM. Due to limited funding Kate wanted Baker and OHM to determine the potential remedial alternatives that could be applied at these sites and determine the costs for collecting sufficient data to support this. Additionally, Kate wanted Baker to determine what data gaps still existed that would be required to complete the delineation of the contamination and what data would be required to conduct groundwater modeling for each of the sites. Matt said that he would discuss these scenarios with individuals at Baker and assess if modeling or development of remedial alternatives could be completed prior to the extent of contamination being known or if these items could be completed in conjunction with one another during the Phase II investigation. Due to the severity of the contamination detected in Phase I Kate is hoping to find funding to continue some portion of the additional work required at these sites.

Long-Term Monitoring

Tom Trebilcock participated as a guest in order to discuss the status of the monitoring program and recommendations that would be forthcoming now that Baker and OHM have taken over these tasks. Tom mentioned that some of wells are in need of maintenance (i.e., painting, replace locks, well caps). As for the monitoring at Site 78 there are several disparities between the ROD and what was being conducted under the FSC contract. These discrepancies included but were not limited to recovery and supply well sampling. Additionally, Tom mentioned that due to the number and arrangement of wells associated with the other programs it may be advantageous to use these wells in the monitoring program due to their proximity to the plume. The location of the recovery wells should be evaluated and the placement and installation of new wells determined.

Kate was in favor of modifying the sampling program to use wells that are within the proximity of the plume. Jim and Gena mentioned that the ideal solution for the recovery wells would be to install additional recovery wells in the area of the south plant and shut down some of the existing recovery wells that have no impact on the plume.

Tom went on to mention that with the assistance of GIS we will be able to determine the UST/IR wells that are most advantageous for the monitoring program. Rich stated that he will be able to have well locations and analytical data for each location by January.

Site 41

Mick Senus provided the Team with an update regarding the status of the Site 41 surface water variance and groundwater reclassification. Mick provided the history of this Site so that Dave would be aware of what the WiRO was requesting. Mick stated that he has been dealing with Boyd Devaine from the NC Raleigh office regarding the surface water variance. Boyd has visited the site and viewed the seeps and in his opinion he does not feel that a reclassification is required. However, in follow up conversation that Mick has had with the WiRO has been told that as for groundwater that the RS and GC reclassification is no longer the path that should be pursued. A Special Order of Consent (SOC) is to be the mechanism the we should be attempting to obtain. However, the WiRO has explained that the SW variance must be granted prior to the issuing of the SOC. This poses the problem because we have the Raleigh office telling us we don't need the SW variance and the WiRO states that we must have the SW variance prior to obtaining the SOC.

Gena stated that she would like to discontinue pursuit of the variance and change the text of the ROD to indicate that this will not be pursued. Dave would like to get a look at the data from the RI and base line monitoring prior to making a decision. Dave said that if after his examination of the data he will decide if he agrees with not going ahead with variance that the ROD can be revised and Baker can prepare ESD.

Site 35 Treatabiltity Study Update

Dan Bonk presented a summary of the results of the treatability study for the IAS. The results indicated that conventional vertical air sparging would likely be ineffective for contaminants that are situated atop the underlying confining layer. Clay seams above the underlying layer present a problem to horizontal air sparging also. Baker suggested an air sparging trench which, in theory, will alleviate the problems associated with the clay seams.

Dan also presented the analytical results which seem to indicate that some natural attenuation may be taking place as the contamination nears Brinson Creek, especially in the case of the BTEX contamination. Chlorinated solvent compounds appear to be migrating at a lesser rate.

Jim suggested that in lieu of the data obtained to date, we should reconsider placing the remedial system on the south side of the proposed U.S. Route 17 Bypass where access and subsurface conditions will be more conclusive to construction success. Dave and Gena agreed to consider this approach provided that a case could be made for the Natural Attenuation of the contaminants that would remain unremediated between the remediation system and Brinson Creek.

Action Items

Rich
1. Have Dan Fisher contact John Cotton regarding history of Site 73.
2. Send copy of BRAGS to Dave.
3. Generate figure with UST/IR well locations using GIS.

Matt
1. Provide Dave with analytical findings and figures for Site 41.

Kate
1. Supply Rich with Air Force Protocol for Chlorinated Solvent from Bill Mullen.

Jim
1. Supply Baker with boring logs from recovery wells at Lot 203.

Next Meetings

Date: January 7, 8, 9
Location: Clearwater Florida
Chair: Matt Bartman
Host: Dick Handrahan/Kate Landman

Date: March 19, 20
Location: Raleigh, North Carolina
Chair: Rich Bonelli
Host: Dave Lown

Agenda Topics for Next Meeting

Phase II Investigation Scoping Sites 88, 89, 93
HPIA - what to do?/GPS/Supply wells abandoned?
Biocell at Lot 203 - what is capacity and can it be permitted for PAH soil
FY97 Funding
Mark Barnes leaving (UST interface)
OU No. 6
Modeling updates?
Lot 201 Projects
Well abandonment Sites 80 and 3
CD-ROM submittals
RAB members "Environmental Justice"
Status of OU 1 Operations
Site 36 TCRA , lead and iron in soils, Groundwater TCE
Site 86 Groundwater TCE Remedial Action

ROUTING SLIP

M 18 1988

	ACTION	INFO	INITIAL
BMO		✓	
DBMO		✓	
DIR. ADMIN			
DIR. OPS		✓	5/23
DIR. M&R			
DIR. UTIL		✓	5/23
OTHER			
SECRETARY			

COMMENTS:

11530
0325

6280/9
FAC
MAY 1 8 1988

From: Commanding General, Marine Corps Base, Camp Lejeune, North Carolina 28542-5001
To: Commandant of the Marine Corps-LFL

Subj: RESPONSE TO DOCUMENTED GROUNDWATER CONTAMINATION AT HADNOT POINT FUEL FARM

Ref: (a) MCON Project P-357, New Vehicle Ready Fuel Storage Fac of 5 Feb 87

Encl: (1) O'Brien & Gere, Inc. ltr of 26 Apr 88 w/o well boring logs

1. Request your assistance in expediting funding for the referenced project to alleviate contamination of the Hadnot Point drinking water supply. As an interim measure, we plan to shut down the fuel farm and dispense fuel at a temporary site using bulk fuel bladders, rail cars or truck tanks. To minimize the time required for this makeshift operation, it is requested that P-357 be elevated to the FY-90 military construction program.

2. The enclosure indicates fuel thickness values from 2.24 feet to 13.74 feet in the groundwater aquifer. We have notified the State of North Carolina of these data.

3. Contaminants attributed to gasoline compounds, as well as other volatile organic compounds, were documented in the Hadnot Point water supply aquifer at depths greater than 100 feet during 1984 and 1985. This resulted in the 1985 closure of eight potable wells near the fuel farm. A fuel spill recovery system is being designed under FY-88 LANTDIV contract. The recovery system will become operational as soon as practical.

4. Inventory records indicate continued losses of fuel products to the ground. Positive and swift action will demonstrate to the various regulatory agencies and the public our continued concern for human health and the environment in general.

Subj: RESPONSE TO DOCUMENTED GROUNDWATER CONTAMINATION AT HADNOT
POINT FUEL FARM

7. Points of contact for this matter are Mr. Al Austin for MILCON issues and Mr. Bob Alexander for contamination issues. Both can be reached at autovon 484-3034.

T. J. DALZELL
By direction

Copy to:
LANTDIV

Blind copy to:
AC/S, Log
SJA
PWO
—>BMO

OPNAV 5216/144A (Rev. 8-81)
S/N 0107-LF-052-2320

DEPARTMENT OF THE NAVY

Memorandum

DATE: 30 March 1987 6280

FROM: OIC, DSSC

TO: Assistant Chief of Staff, Facilities (Attn: Bob Alexander)
Via: Assistant Chief of Staff, Logistics

SUBJ: RECOVERY OF UNDERGROUND GASOLINE SPILLING

Ref: (a) AC/S, Fac Memo 6280/14 of 18 Feb 87

1. Following information is furnished as requested by the reference:

March 1982	HADNOT POINT: Maintenance vehicle ran over underground unleaded gasoline line and broke it. Maintenance repaired line on same day.
April 1983	HADNOT POINT: Maintenance exposed underground fuel lines. One diesel line had a small pin hole leak. Diesel (Daily Inventory) was not showing any significant losses.
March 1985	HADNOT POINT: Maintenance exposed valves on Tanks 1023 and 1025. Found small puddles of gasoline around 1025 valve. Monthly Inventory showed loss of 1,618 gallons of unleaded.
May 1985	CAMP GEIGER: Maintenance ran pressure test on unleaded gasoline line. Test showed possible leak. Monthly Inventory showed loss of 1,561 gallons of unleaded with 1,281 gallons at Camp Geiger. Maintenance began installation of new above ground unleaded gasoline line. When line was completed, loss dissipated.
January 1986	HADNOT POINT: Experienced unleaded gasoline losses. Most of these losses seem to occur when off loading fuel into Tank 1033. Monthly Inventory showed 1,038 gallon loss of unleaded.

M. J. FISHER

TABLE 1

HISTORY OF FUEL LOSSES
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

Location*	Date	Fuel Type	Amount of Loss	Notes
1	4/83	diesel	not noticeable in inventory	line leak (pinhole).
2	(1983)	diesel	unknown	surface seepage
3	3/82	unleaded	unknown	line leak (broken, repaired on same day)
4	1/86	unleaded	1,030 gallons	- - -
5	3/85	unleaded	1,618 gallons	valve leaks
6	(1979)	diesel, unleaded, possibly regular	20,000 - 30,000 gallons	line leak
-	8/87	unleaded	47 gallons	noticed in inventory
-	9/87	unleaded	447 gallons	noticed in inventory

* Locations correspond to Figure 3.

OPNAV 5216/144A (Rev. 8-81)
S/N 0107-LF-052-2320

DEPARTMENT OF THE NAVY
Memorandum

MAIN

DATE: 27 July 1987

FROM: Utilities Systems General Foreman

TO: Director, Utilities Branch
Via: Utilities General Foreman

SUBJ: INFORMATION CONCERNING RAW WATER WELLS; REQUEST FOR

1. The Navy Assessment and Controls of Installation Pollutants (NACIP) Program began the sampling of raw water wells aboard Marine Corps Base, Camp Lejeune in late 1984. Fifteen raw water wells have been discovered to contain Volitial Organic Contaminates (VOC's) of different levels and different types.

2. The following raw water wells were secured on the dates indicated:

602	-	11-30-84	651	-	2-4-85
601 renumb. 660		12-6-84	RR-227 renumb.- RR-229		2-4-85
608	-	12-6-84			
634	-	12-14-84	TT-26	-	2-8-85
637	-	12-14-84	TT-23	-	2-8-85
TT-25	-	1-14-87	652	-	2-8-85
645	-	1-13-87	653	-	2-8-85
AS-106	-	1-13-87	AS-4150	-	2-4-85

3. The approximate cost of a new well is $85,000.00. This equates to $1,275,000.00 of equipment not being utilized with possible down time equaling years in the future. The following questions are of immediate concern and need to be addressed.

a. Are we going to attempt to treat VOC's either point of use, at well head, or in plant treatment?

b. Are we going to attempt to clean up VOC's?

c. If clean up is determined, will this re-claim raw water wells in future?

d. If we are not going to re-claim the secured wells, a determination should be made to re-use well pumps, auxiliary motors and applicable equipment. Would relocating well pumps transfer VOC's pollution from one well to another? Continued down time of this equipment will ultimately preclude it from ever re-starting.

e. RR-227 was re-numbered RR-229. During initial sampling, the well contained tri-chlorethane. This chemical was believed to have been left over by the drilling process. Subsequently, it was recommended a vigorous flushing program be undertaken to eliminate the problem. This was accomplished and it was our understanding sub-

MAIN
27 Jul 87

Subj: INFORMATION CONCERNING RAW WATER WELLS; REQUEST FOR

sequent testing showed no trace of VOC's. Can this well be re-started and utilized?

f. 645 was discovered to have benezene. Further investigation revealed a leak in the underground copper tubing feeding gasoline to the auxiliary motor. The line was replaced. Can this well be re-started?

g. Wells 634 and 637 were sampled 3 times. 2 out of three revealed no VOC's. Can they be re-started?

h. Well 652 had 9.0 ppb VOC's and well 653 had 5.5 ppb VOC's. Are we going to use 0.0 ppb as the limit to secure? Is this amount which equals less than 1.0 ppm determined to be too much to run well?

4. We are quickly approaching 3 years since the first of the 15 wells were secured. From my vantage point, these questions need addressing and should be of command interest and action.

B. M. FRAZELLE, II

0324

6280/9
FAC
MAY 18 1988

Mr. Preston Howard
NC Division of Environmental Management
Wilmington Regional Office
7225 Wrightsville Avenue
Wilmington, North Carolina 28403

RE: NOTICE OF RELEASE FROM UNDERGROUND
FUEL STORAGE FACILITIES HADNOT POINT
FUEL FARM

Dear Mr. Howard:

We are forwarding information at the enclosures regarding the identification of fuel products in the groundwaters underlying the subject fuel farm. This data as noted in the engineer's letter represents the initial field data collection and will be followed by a detailed plume report in the next three to four weeks.

This detailed engineering report will document the plume boundary and estimated product thickness and provide a recommended Location for a recovery well or wells. We will forward this report to you immediately upon receipt by our office.

In the interim, the Commanding General has directed the Fuel Farm be closed and the tanks and lines drained. An interim fuel farm will be established with all environmental precautions to preclude further contamination. We have programmed a permanent replacement facility for the fuel farm and will keep you abreast of developments in the design and construction process as it unfolds.

6280/9
FAC

For further information in this matter, please contact Mr. Bob Alexander, (919) 451-3034.

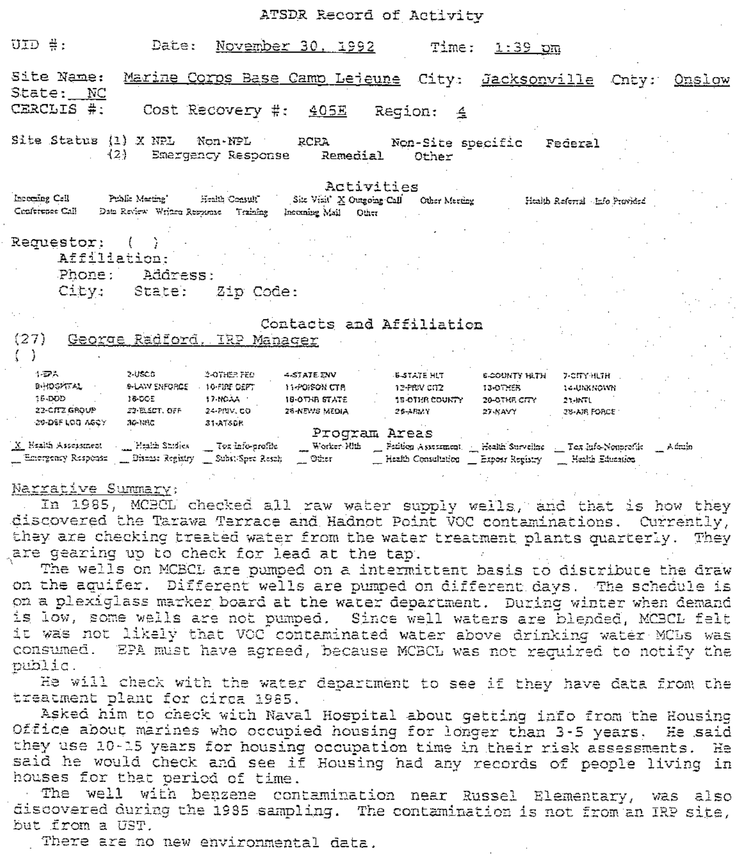
Sincerely,

T. J. DALZELL
Colonel, U. S. Marine Corps
Assistant Chief of Staff, Facilities
By direction of the Commanding General

Encl:
(1) O'Brien & Gere, Inc. ltr of 26 Apr 88 w/o well boring logs

Copy to:
CMC-LFL
LANTDIV (114)
O'Brien & Gere, Inc.

Blind copy to:
AC/S, Log
SJA
JPAO
NREAD
→BMO
PWO
EnvEngr



ATSDR Record of Activity

UID #: Date: November 30, 1992 Time: 1:39 pm

Site Name: Marine Corps Base Camp Lejeune City: Jacksonville Cnty: Onslow
State: NC
CERCLIS #: Cost Recovery #: 405E Region: 4

Site Status (1) X NPL Non-NPL RCRA Non-Site specific Federal
(2) Emergency Response Remedial Other

Activities

Incoming Call Public Meeting' Health Consult' Site Visit' X Outgoing Call Other Meeting Health Referral Info Provided
Conference Call Data Review Written Response Training Incoming Mail Other

Requestor: ( )
Affiliation:
Phone: Address:
City: State: Zip Code:

Contacts and Affiliation

(27) George Radford, IRP Manager
( )

1-EPA 2-USCG 3-OTHER FED 4-STATE ENV 5-STATE HLT 6-COUNTY HLTH 7-CITY HLTH
8-HOSPITAL 9-LAW ENFORCE 10-FIRE DEPT 11-POISON CTR 12-PRIV CITZ 13-OTHER 14-UNKNOWN
15-DOD 16-DOE 17-NOAA 18-OTHR STATE 19-OTHR COUNTY 20-OTHR CITY 21-INTL
22-CITZ GROUP 23-ELECT. OFF 24-PRIV. CO 25-NEWS MEDIA 26-ARMY 27-NAVY 28-AIR FORCE
29-DEF LOG AGCY 30-NRC 31-ATSDR

Program Areas

X Health Assessment __ Health Studies __ Tox Info-profile __ Worker Hlth __ Petition Assessment __ Health Surveilnc __ Tox Info-Nonprofile __ Admin
__ Emergency Response __ Disease Registry __ Subst/Spec Resch __ Other __ Health Consultation __ Expos Registry __ Health Education

Narrative Summary:

In 1985, MCBCL checked all raw water supply wells, and that is how they discovered the Tarawa Terrace and Hadnot Point VOC contaminations. Currently, they are checking treated water from the water treatment plants quarterly. They are gearing up to check for lead at the tap.

The wells on MCBCL are pumped on a intermittent basis to distribute the draw on the aquifer. Different wells are pumped on different days. The schedule is on a plexiglass marker board at the water department. During winter when demand is low, some wells are not pumped. Since well waters are blended, MCBCL felt it was not likely that VOC contaminated water above drinking water MCLs was consumed. EPA must have agreed, because MCBCL was not required to notify the public.

He will check with the water department to see if they have data from the treatment plant for circa 1985.

Asked him to check with Naval Hospital about getting info from the Housing Office about marines who occupied housing for longer than 3-5 years. He said they use 10-15 years for housing occupation time in their risk assessments. He said he would check and see if Housing had any records of people living in houses for that period of time.

The well with benzene contamination near Russel Elementary, was also discovered during the 1985 sampling. The contamination is not from an IRP site, but from a UST.

There are no new environmental data.

Action Required/Recommendations/Info Provided:
Follow-up on requested items.

Signature: ______________________ Date: November 30, 1992

cc: Letty Arredondo, Diane Jackson

Enclosures: Yes ( ) No ( ); MIS entered: Yes ( ) No ( )

ATSDR Record of Activity

UID #: Date: December 15, 1992 Time: 4:30 pm

Site Name: Marine Corps Base Camp Lejeune City: Jacksonville Cnty: Onslow
State: NC

CERCLIS #: Cost Recovery #: 405E Region: 4

Site Status (1) X NPL Non-NPL RCRA Non-Site specific Federal
(2) Emergency Response Remedial Other

Activities

Incoming Call Public Meeting Health Consult Site Visit Outgoing Call Other Meeting Health Referral [✓ Info Provided]
Conference Call Data Review Written Response Training Incoming Mail Other

Requestor: (31) Nancy Sonnenfeld
Affiliation:
Phone: Address:
City: State: Zip Code:

Contacts and Affiliation

( ) _
( )

1-EPA	2-USCG	3-OTHER FED	4-STATE ENV	5-STATE HLT	6-COUNTY HLTH	7-CITY HLTH
8-HOSPITAL	9-LAW ENFORCE	10-FIRE DEPT	11-POISON CTR	12-PRIV CITZ	13-OTHER	14-UNKNOWN
15-DOD	16-DOE	17-NOAA	18-OTHR STATE	19-OTHR COUNTY	20-OTHR CITY	21-INTL
22-CITZ GROUP	23-ELECT. OFF	24-PRIV. CO	25-NEWS MEDIA	26-ARMY	27-NAVY	28-AIR FORCE
29-DEF LOG AGCY	30-NRC	31-ATSDR				

Program Areas

X Health Assessment __ Health Studies __ Tox Info-profile __ Worker Hlth __ Petition Assessment __ Health Surveline __ Tox Info-Nonprofile __ Admin
__ Emergency Response __ Disease Registry __ Subst-Spec Resch __ Other __ Health Consultation __ Exposr Registry __ Health Education

Narrative Summary:
Attached is information available for monitoring wells in 1988. Potable well data are available from the State; however, they may not be current and may not contain VOC information. MCBCL will be sampling potable wells in the near future.

Action Required/Recommendations/Info Provided:
Attachment

Signature: ______________________ Date: December 15, 1992

cc: Diane Jackson, Libby Arredondo

Enclosures: Yes (X) No ( ); MIS entered: Yes ( ) No (X)

FROM: Sonnenfeld, Nancy

TO: Sonnenfeld, Nancy
Aoyama, Stephen EXPK/ATSDTO1
DATE: 12-15-92
TIME: 14:44

CC:
SUBJECT: Camp LeJeune comments
PRIORITY:
ATTACHMENTS:

I found an inconsistency on page 5 of the health assessment draft document for LeJeune. On that page the health assessment states that a groundwater investigation was conducted at Site 22 in 1988. However, the sampling data from base wells presented on page 69 (the only data available on potable wells) are from the years 1984 - 1986. Is the monitoring data for potable wells on page 69 from 1986 or 1988? Were the wells closed in 1986 or 1988, or were they closed sometime after that?

I imagine that it is extremely difficult to keep track of all of this information! I'll keep you abreast of any other inconsistencies that I find. I realize that you are very busy with other things right now, and appreciate your time in answering my questions.

Thanks
Nancy Sonnenfeld

DOC.No.:CLEJ-00417-3.14-12/01/88
3543.002

Excerpts from

FINAL REPORT

CONTAMINATED GROUND WATER STUDY
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
HADNOT POINT AREA
CONTRACT NO. N62470-86-C-8740

NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA

DECEMBER, 1988

PREPARED BY:

O'BRIEN & GERE ENGINEERS, INC.
8201 CORPORATE DRIVE, SUITE 1120
LANDOVER, MARYLAND 20785

DOC.No.:CLEJ-00417-3.14-12/01/88

Table 5
Ground Water Sample Analysis
Hadnot Point Fuel Farm
Camp Lejeune, NC

max MCL

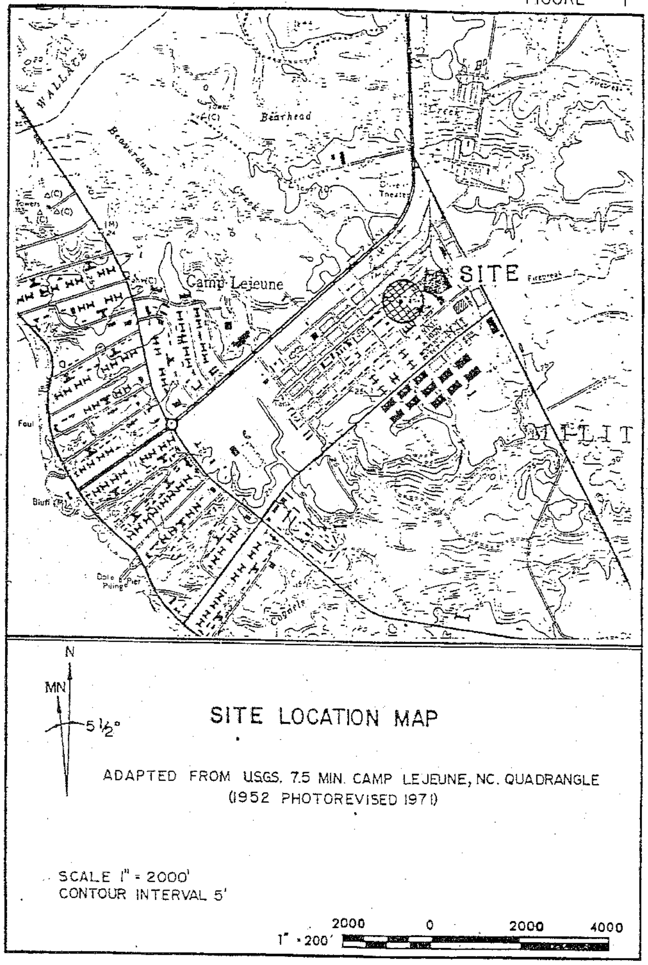
Well No.	Date	BEN (ppb)	TOL (ppb)	EBEN (ppb)	XYL (ppb)	TCE (ppb)	PERC (ppb)	MTBE (ppb)	THC (ppb)
MW-1	4/20/88	19000	36000	3200	21000	<1000	<1000	<10000	97000
MW-2	4/21/88	29000	110000	11000	48000	<1000	<1000	<10000	300000
MW-3	4/20/88	<1	2	<1	4	<1	4	<10	480
MW-4	4/20/88	<1	<1	<1	2	<1	<1	<10	16
MW-5	4/20/88	<1	1	<1	2	<1	<1	<10	<10
MW-6	4/20/88	600	1700	1600	7100	<100	<100	<1000	13000
MW-7	4/21/88	28000	26000	2800	12000	<1000	<1000	<10000	68000
MW-8	4/20/88	19	1	<1	<1	<1	<1	<10	26
MW-9	4/20/88	<1	<1	2	8	<1	<1	<10	92
MW-10	4/20/88	51	1	9	14	<1	<1	<10	170
MW-11	4/20/88	1	1	<1	1	<1	<1	<10	<10
MW-12	4/21/88	19000	17000	1500	8400	<1000	<1000	<10000	50000
MW-13	4/20/88	2	2	2	8	<1	<1	<10	23
MW-14	4/20/88	6	<1	<1	2	<1	<1	<10	11
MW-15	4/21/88	4700	18000	2400	13000	<1000	<1000	<10000	43000
MW-16	4/21/88	28000	28000	1900	12000	<1000	<1000	<10000	79000
MW-17	4/21/88	11000	13000	2500	9100	<100	<100	2800	42000
MW-18	4/21/88	24000	42000	1900	12000	<1000	<1000	<10000	96000
MW-19	4/21/88	21	150	53	130	<1	<1	<10	640
MW-20	4/21/88	60	160	79	96	1	<1	<10	870

MCL = 5ppb

LEGEND: BEN - Benzene
TOL - Toluene
EBEN - Ethylbenzene
XYL - Xylenes
TCE - Trichloroethene
PERC - Tetrachloroethene
MTBE - MTBE
THC - Total Hydrocarbons

DOC.No.:CLEJ-00417-3.14-12/01/88

FIGURE 1

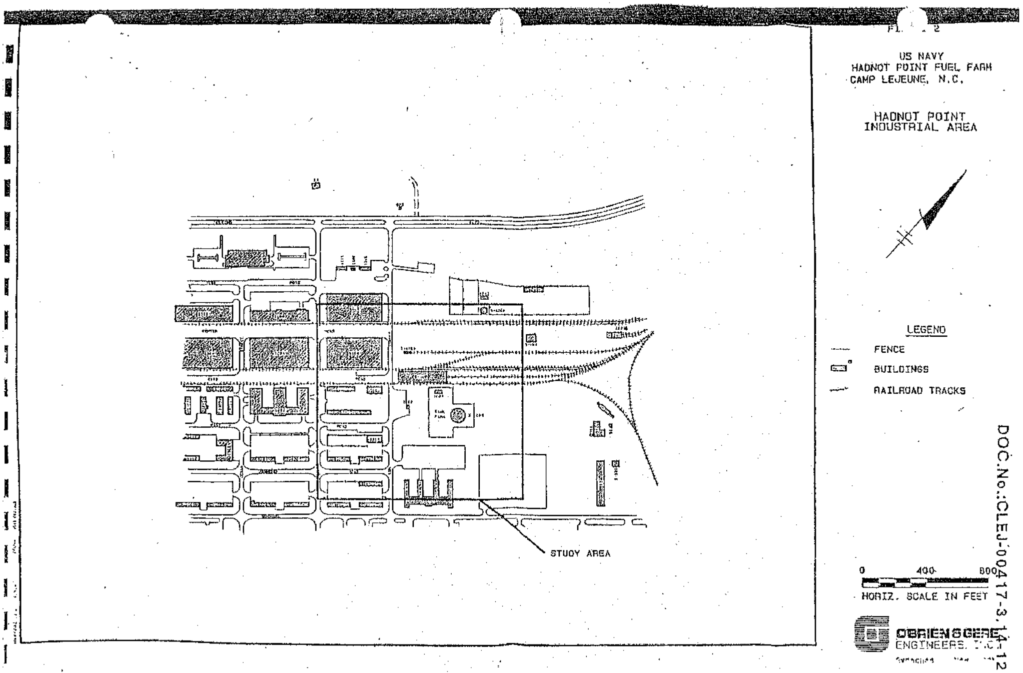


SITE LOCATION MAP

ADAPTED FROM USGS. 7.5 MIN. CAMP LEJEUNE, NC. QUADRANGLE
(1952 PHOTOREVISED 1971)

SCALE 1" = 2000'
CONTOUR INTERVAL 5'

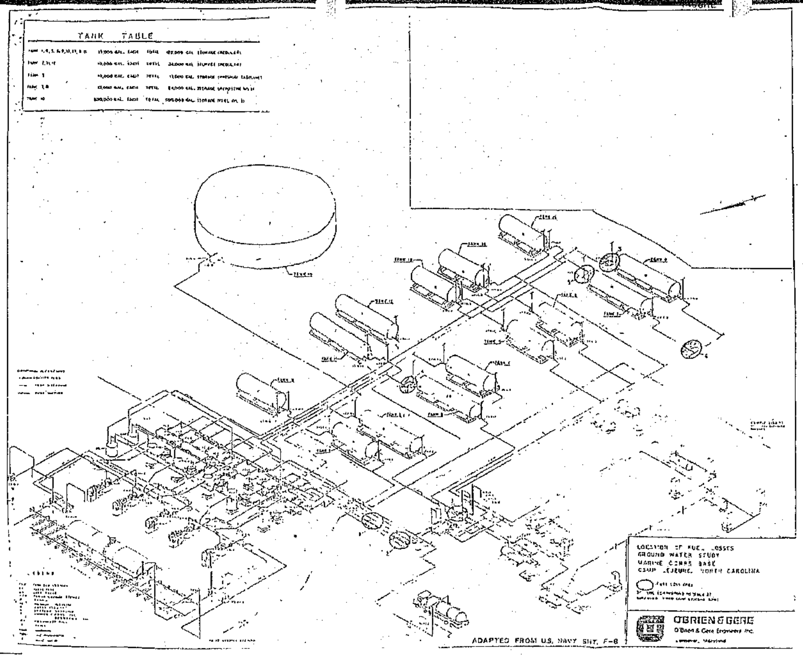
O'BRIEN & GERE



FI. 2

US NAVY
HADNOT POINT FUEL FARM
CAMP LEJEUNE, N.C.

HADNOT POINT
INDUSTRIAL AREA



TANK TABLE

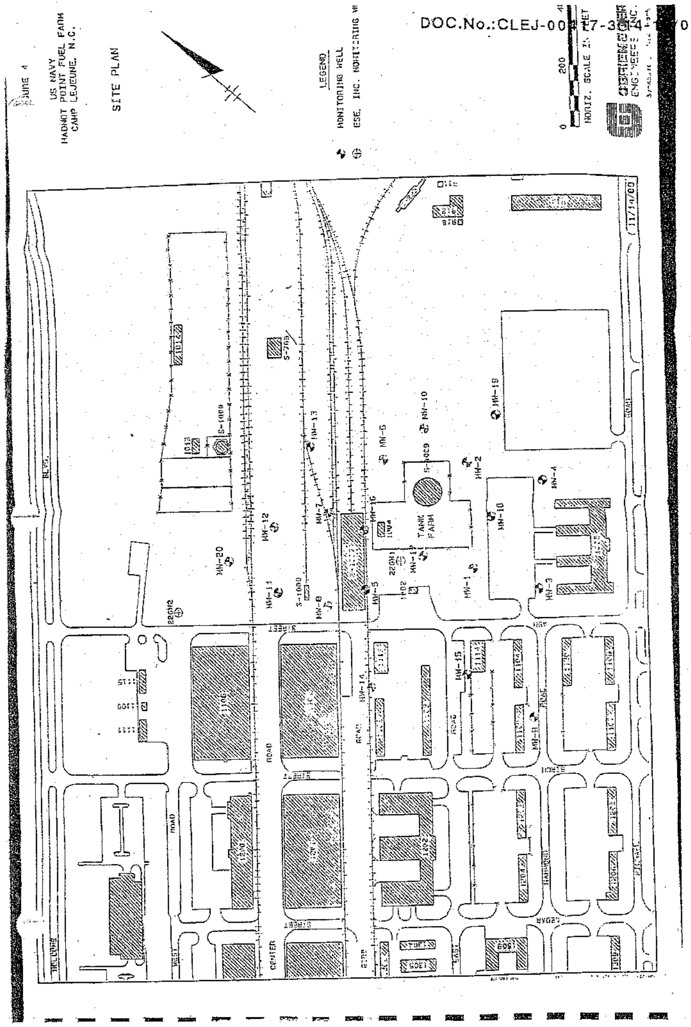
TANK [illegible]	15,000 GAL. EACH	TOTAL	[illegible] GAL. STORAGE [illegible]
TANK [illegible]	[illegible] GAL. EACH	TOTAL	[illegible] GAL. STORAGE [illegible]
TANK [illegible]	[illegible] GAL. EACH	TOTAL	[illegible] GAL. STORAGE [illegible]
TANK [illegible]	[illegible] GAL. EACH	TOTAL	[illegible] GAL. STORAGE [illegible]
TANK 10	[illegible] GAL. EACH	TOTAL	[illegible] GAL. STORAGE [illegible]

LOCATION OF FUEL LOSSES
GROUND WATER STUDY
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

O'BRIEN & GERE
O'Brien & Gere Engineers Inc.

ADAPTED FROM U.S. NAVY SHT. F-8

DOC.No.:CLEJ-00417-3014-12/01/88



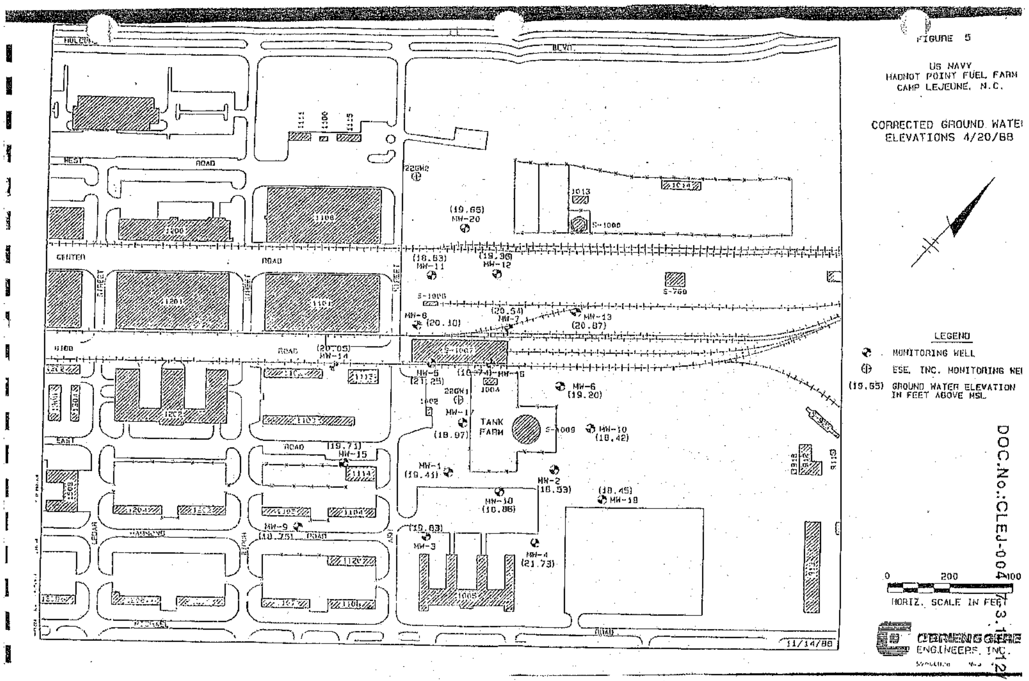
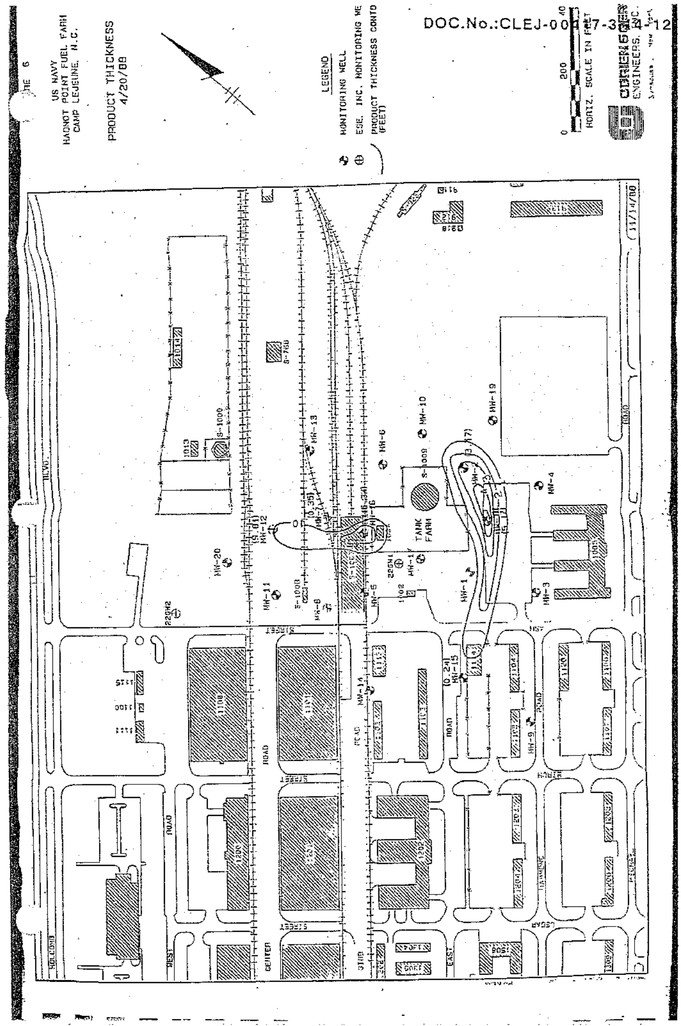


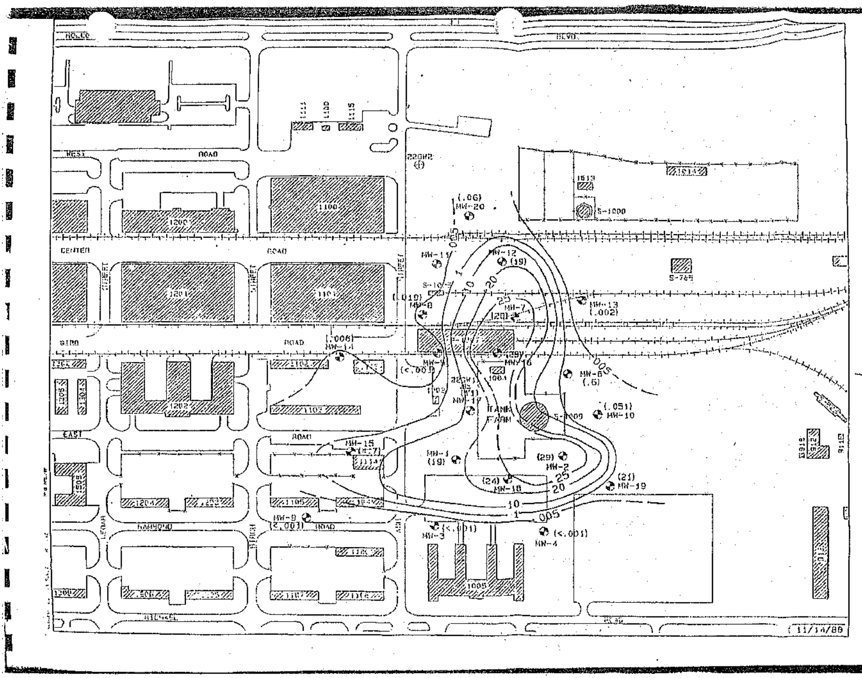
FIGURE 5

US NAVY
HADNOT POINT FUEL FARM
CAMP LEJEUNE, N.C.

CORRECTED GROUND WATE
ELEVATIONS 4/20/88

DOC.No.:CLEJ-00[illegible]7-3[illegible]-12 01/88





IGURE 7

US NAVY
HADNOT POINT FUEL FARM
CAMP LEJEUNE, N.C.

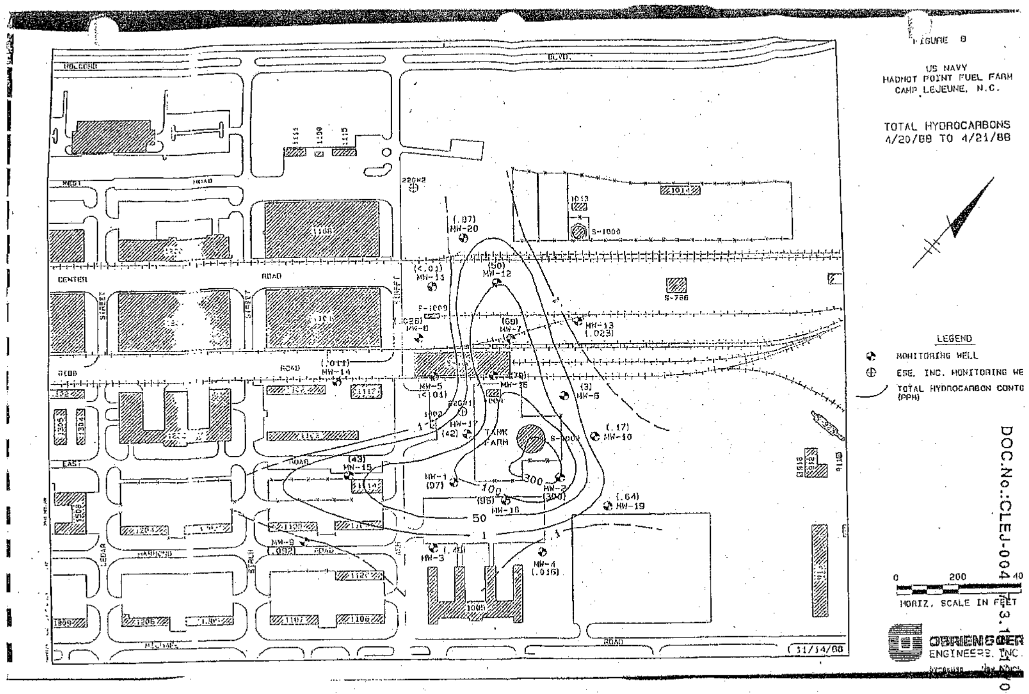
BENZENE CONCENTRATIOI
4/20/88 TO 4/21/88

LEGEND

●	MONITORING WELL
⊖	ESE, INC. MONITORING W
—	BENZENE CONCENTRATION CONTOUR (PPM)

0 200 4
HORIZ. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC



DOC.No.:CLEJ-004 3.1 01/88

ATSDR Record of Activity

UID #: Date: December 15, 1992 Time: 4:30 pm

Site Name: Marine Corps Base Camp Lejeune City: Jacksonville Cnty: Onslow
State: NC

CERCLIS #: Cost Recovery #: 405E Region: 4

Site Status (1) X NPL Non-NPL RCRA Non-Site specific Federal
(2) Emergency Response Remedial Other

Activities

Incoming Call Public Meeting* Health Consult* Site Visit* Outgoing Call Other Meeting Health Referral [✓ Info Provided]
Conference Call Data Review Written Response Training Incoming Mail Other

Requestor: (31) Nancy Sonnenfeld
Affiliation:
Phone: Address:
City: State: Zip Code:

Contacts and Affiliation

( ) _
( )

1-EPA	2-USCG	3-OTHER FED	4-STATE ENV	5-STATE HLT	6-COUNTY HLTH	7-CITY HLTH
8-HOSPITAL	9-LAW ENFORCE	10-FIRE DEPT	11-POISON CTR	12-PRIV CITZ	13-OTHER	14-UNKNOWN
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29-DEF LOG AGCY	30-NRC	31-ATSDR				

Program Areas

X Health Assessment __ Health Studies __ Tox Info-profile __ Worker Hlth __ Petition Assessment __ Health Surveline __ Tox Info-Nonprofile __ Admin
__ Emergency Response __ Disease Registry __ Subst-Spec Resch __ Other __ Health Consultation __ Expocr Registry __ Health Education

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Action Required/Recommendations/Info Provided:
Attachment

Signature: ______________________ Date: December 15, 1992

cc: Diane Jackson, Betty Arredondo

Enclosures: Yes (X) No ( ); MIS entered: Yes ( ) No (X)

FROM: Sonnenfeld, Nancy

TO: Sonnenfeld, Nancy
Aoyama, Stephen EXPK/ATSDT01

DATE: 12-15-92
TIME: 14:44

CC:
SUBJECT: Camp LeJeune comments
PRIORITY:
ATTACHMENTS:

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Nancy Sonnenfeld

Excerpts from

DOC.No.:CLEJ-00417-3.14-12/01/88
3543.002

FINAL REPORT

CONTAMINATED GROUND WATER STUDY
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
HADNOT POINT AREA
CONTRACT NO. N62470-86-C-8740

NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA

DECEMBER, 1988

PREPARED BY:

O'BRIEN & GERE ENGINEERS, INC.
8201 CORPORATE DRIVE, SUITE 1120
LANDOVER, MARYLAND 20785

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Hadnot Point Fuel Farm
Camp Lejeune, NC

no MCL

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MCL = 5ppb

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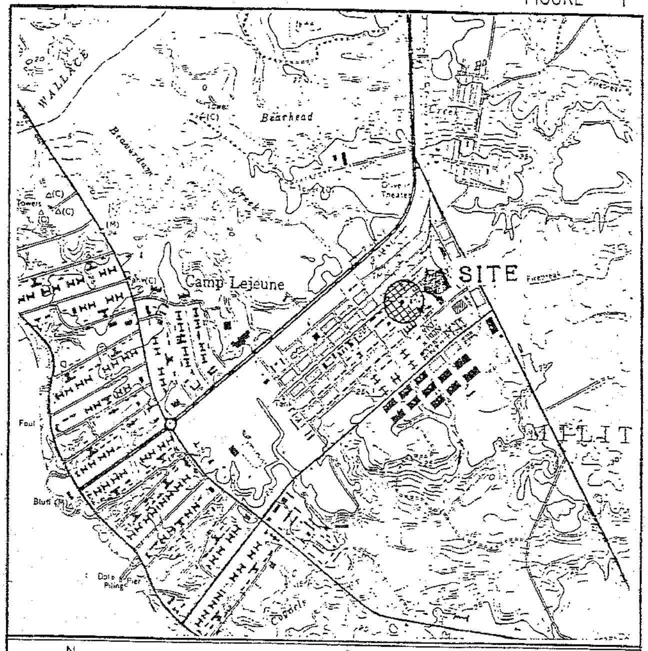
TCE	Trichloroethene
PERC	Tetrachloroethene
MTBE	MTBE
THC	Total Hydrocarbons

FIGURE 1



N
MN
5½°

SITE LOCATION MAP

ADAPTED FROM USGS. 7.5 MIN. CAMP LEJEUNE, NC. QUADRANGLE
(1952 PHOTOREVISED 1971)

SCALE 1" = 2000'
CONTOUR INTERVAL 5'

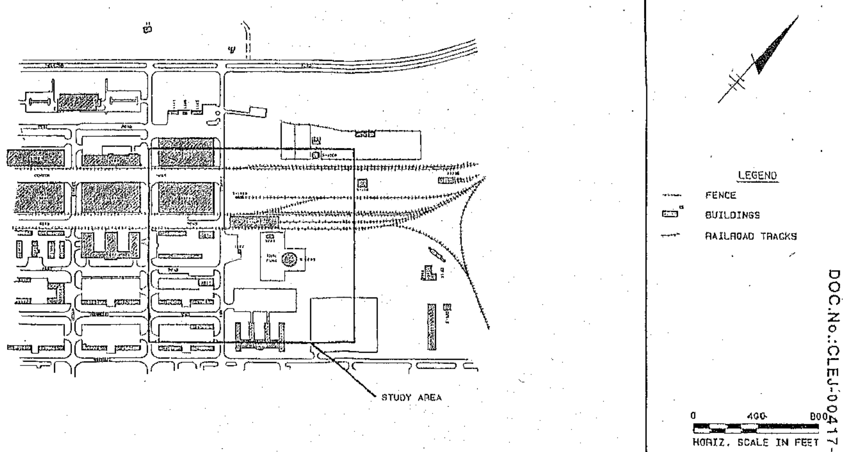
2000 0 2000 4000
1" = 200'

O'BRIEN & GERE

FI. . 2

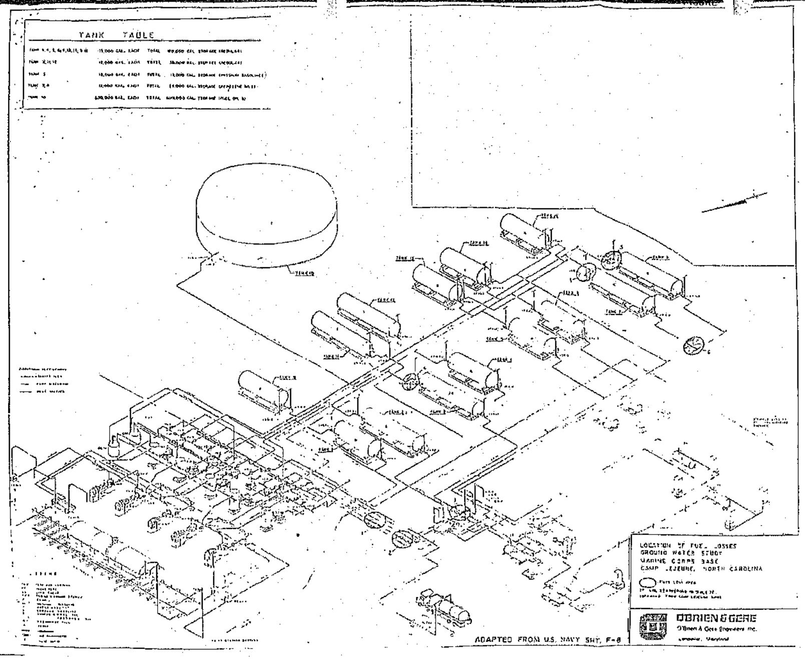
US NAVY
HADNOT POINT FUEL FARM
CAMP LEJEUNE, N.C.

HADNOT POINT
INDUSTRIAL AREA



O'BRIEN & GERE
ENGINEERS, INC.

DOC.No.:CLEJ-00417-3.14-12/01/88



ADAPTED FROM U.S. NAVY SHT. F-8

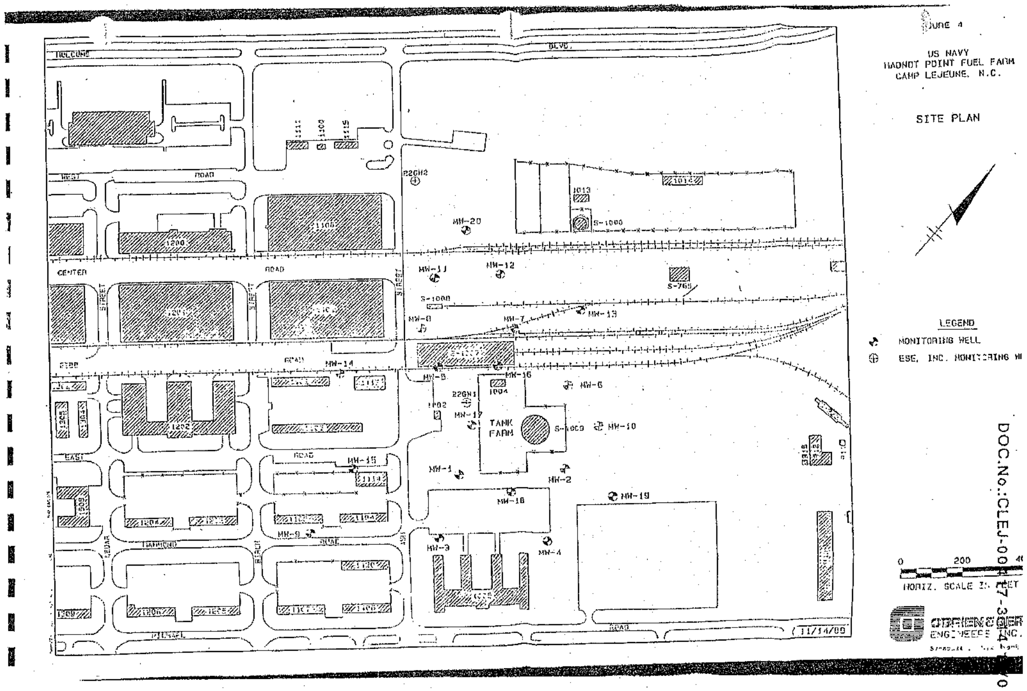


FIGURE 4

US NAVY
HADNOT POINT FUEL FARM
CAMP LEJEUNE, N.C.

SITE PLAN

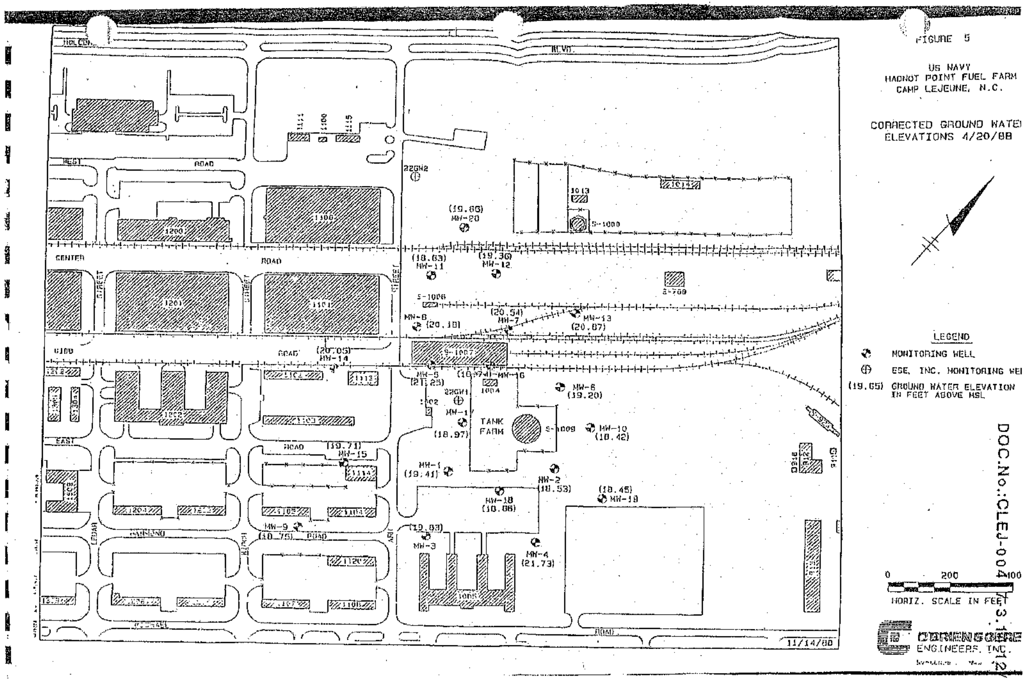
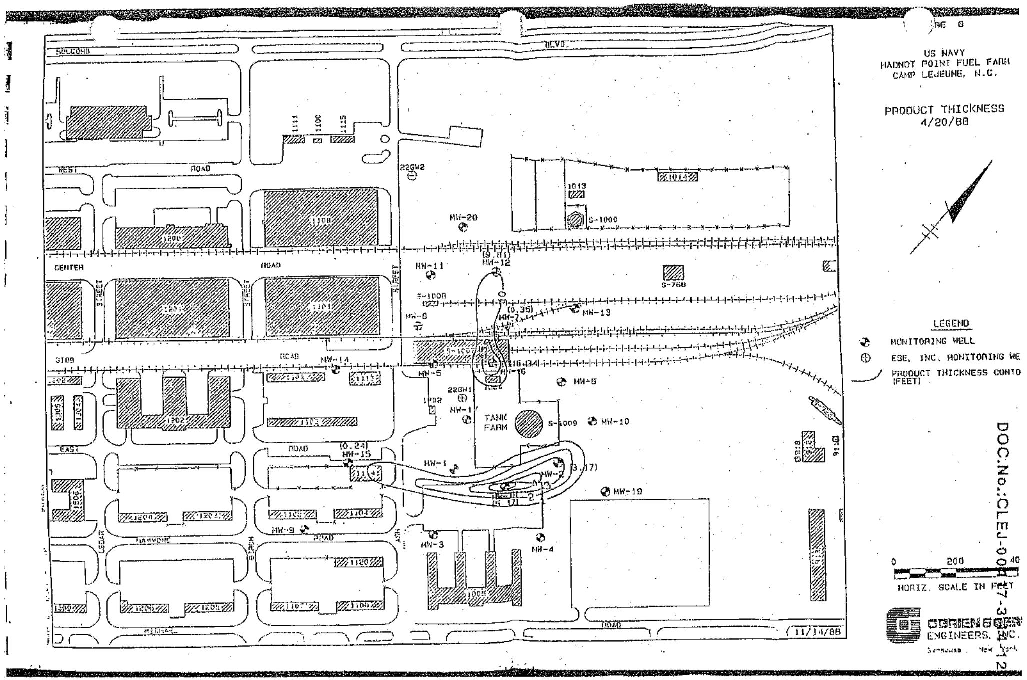


FIGURE 5

US NAVY
HADNOT POINT FUEL FARM
CAMP LEJEUNE, N.C.

CORRECTED GROUND WATE
ELEVATIONS 4/20/88

DOC.No.:CLEJ-00417-3.1[illegible]-12/01/88



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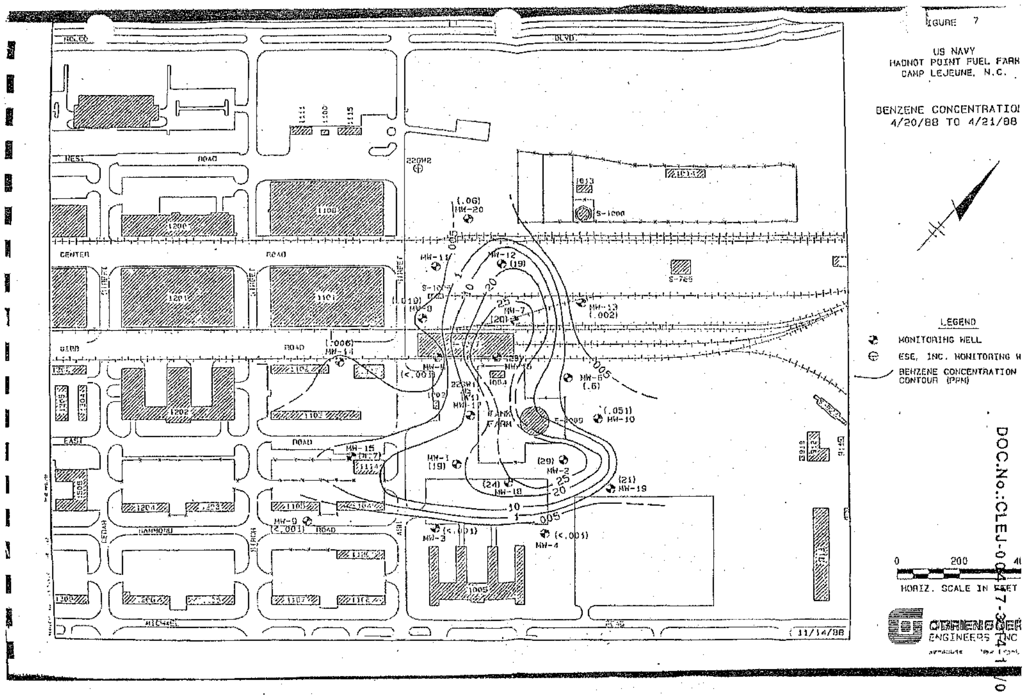


FIGURE 7

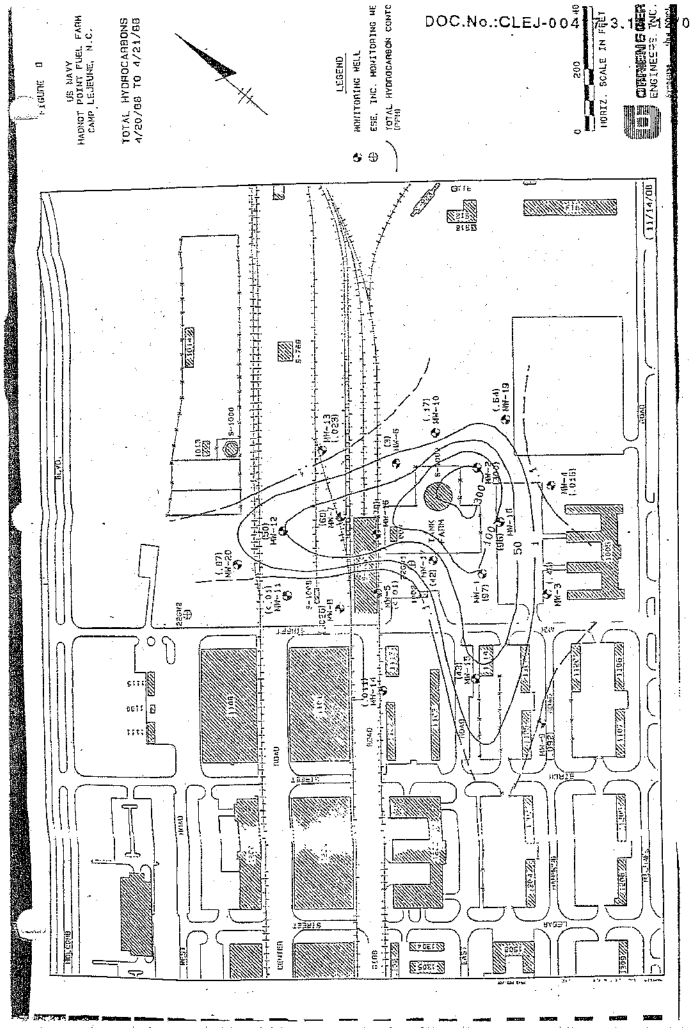
US NAVY
HADNOT POINT FUEL FARM
CAMP LEJEUNE, N.C.

BENZENE CONCENTRATIO
4/20/88 TO 4/21/88

LEGEND
- MONITORING WELL
- ESE, INC. MONITORING W
- BENZENE CONCENTRATION CONTOUR (PPM)

DOC.No.:CLEJ-00417-3014-1 /01/88

DOC.No.:CLEJ-004 3.1 01/88



ATSDR Record of Activity

UID #:____ Date: June 15, 1993 Time: 10:08am

Site Name: Marine Corps Base Camp Lejeune City: Jacksonville Cnty: Onslow State: NC

CERCLIS #: ______________ Cost Recovery #: 405E Region: IV

Site Status (1) X NPL Non-NPL RCRA Non-Site specific X Federal

Activities

Incoming Call Info Provided Public Meeting' Health Consult' Site Visit' X Outgoing Call Other Meeting Health Referral

Contacts and Affiliation

(27) Elizabeth Betz, MCBCL Laboratory (919)451-2471

1-EPA	2-USCG	3-OTHER FED	4-STATE ENV	5-STATE HLT	6-COUNTY HLTH	7-CITY HLTH
8-HOSPITAL	9-LAW ENFORCE	10-FIRE DEPT	11-POISON CTR	12-PRIV CITZ	13-OTHER	14-UNKNOWN
15-DOD	16-DOE	17-NOAA	18-OTHR STATE	19-OTHR COUNTY	20-OTHR CITY	21-INTL
22-CITZ GROUP	23-ELECT. OFF	24-PRIV. CO	25-NEWS MEDIA	26-ARMY	27-NAVY	28-AIR FORCE
29-DEF LOG AGCY	30-NRC	31-ATSDR				

Program Areas

X Health Assessment _ Health Studies _ [illegible] _ [illegible] _ [illegible] _ [illegible] _ [illegible] _ [illegible]

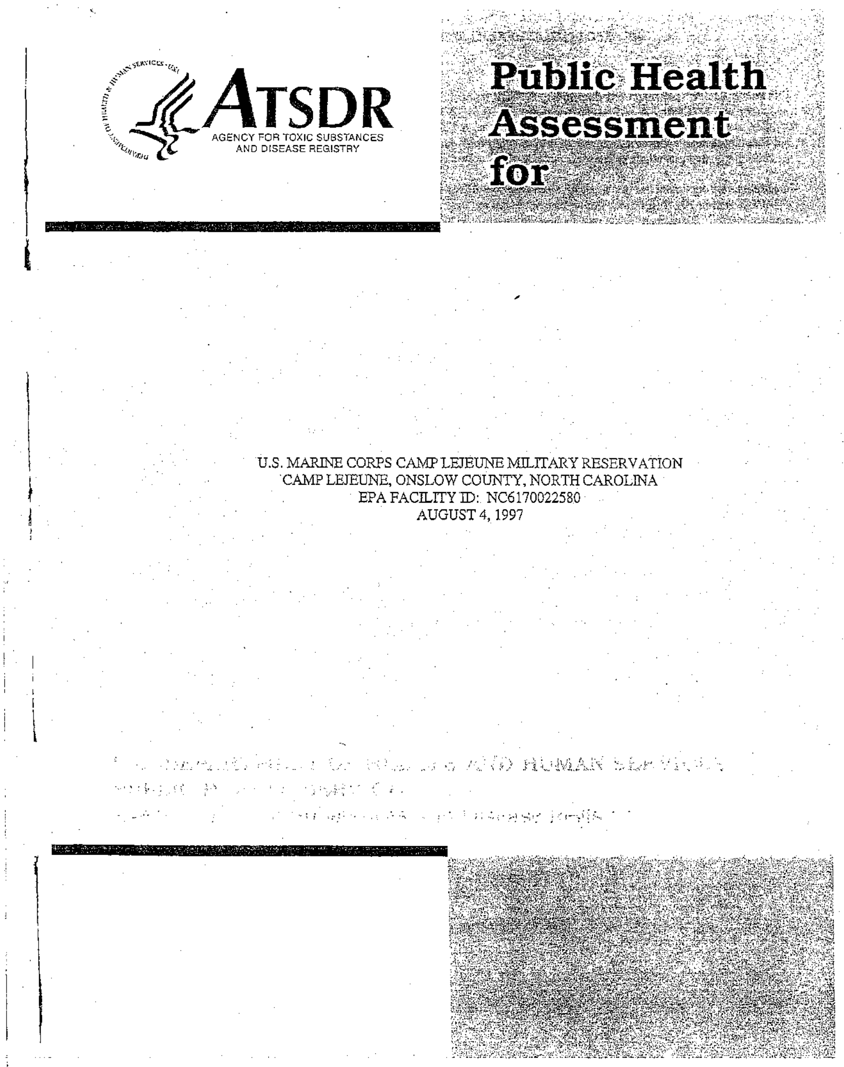
Narrative Summary:

1. Ms. Betz confirmed that it was common practice (unwritten) at MCBCL to shut down a well when contamination is detected in the well, regardless of the level detected. The well was then retested to confirm the contamination. The water department must get permission from the Commanding General to put the well back on line.
2. VOC's were not routinely analyzed prior to November 1984 when the Safe Drinding Water Act (SDWA) became effective. In November 1984, benzene was discovered in HP602, and then VOCs were detected in the other wells also.
3. Prior to November 1984, the lab detected stray peaks of trihalomethanes (THMs), depending on which Tarawa Terrace Housing Area or Hadnot Point Industrial Area well was pumping. There are some possible early detections of TCE; however, TCE was not regulated until November 1984.
4. Ms. Betz has been at MCBCL since 1979 when there were 8 water systems. The lab did at least one complete round of testing of the base wells. After 1986, some of the wells were tested by the Installation Restoration Program (IRP), and she does not have access to that data.
5. Ms. Betz was not aware of the TRC meeting on 6/21 until I told her. She said she will be on base on Monday 6/21 and gave me directions to her office. I told her that we wanted to talk to the water system people, and if we had time would drop by to see her.

Action Required/Recommendations/Info Provided:
Ms. Betz's office is in Building 65, 2 blocks before Bldg. 1 (IRP offices). Turn on Lucy Brewer St.; her Bldg is behind the Judge Advocate's Bldg, far left door.

Signature: __________________ Date: June 15, 1993

cc: Diane Jackson, Carole Hossom



ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

Public Health Assessment for

U.S. MARINE CORPS CAMP LEJEUNE MILITARY RESERVATION
CAMP LEJEUNE, ONSLOW COUNTY, NORTH CAROLINA
EPA FACILITY ID: NC6170022580
AUGUST 4, 1997

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry

24. Agency for Toxic Substances and Disease Registry. ATSDR Record of Activity for telephone communication with Neal Paul, director of Installation Restoration Division, MCB Camp Lejeune. November 21, 1994.

25. Agency for Toxic Substances and Disease Registry. ATSDR Record of Activity for telephone communication with Patrick Watters, State of North Carolina Department of Environment, Health, and Natural Resources. December 8, 1994.

26. Marine Corps Base Camp Lejeune. Letter from Robert L. Warren Assistant Chief of Staff, February 1994.

27. Granger Laboratories. Analyses of samples 206 and 207 from site coded TT and samples 208 and 209 coded HP. Samples received on July 29, 1982. Letter from Bruce Babson, to Commanding General of MCB Camp Lejeune, dated August 10, 1982.

28. Agency for Toxic Substances and Disease Registry. ATSDR Record of Activity for meeting with Stan Miller and Mack Frizelle, Water Department, MCB Camp Lejeune. October 26, 1993.

29. Environmental Science and Engineering, Inc. Characterization step report for Hadnot Point Industrial Area, May 1988.

30. Baker Environmental, Inc., Foster Wheeler Enviresponse, Inc, and Weston. Supplemental aquatic survey for Wallace Creek and Bearhead Creek, Operable Unit No. 2 (Sites 6, 9, and 82). September 1994.

31. Agency for Toxic Substances and Disease Registry. ATSDR Record of Activity for meeting with Elizabeth Betz, Water Quality Department, MCB Camp Lejeune. October 27, 1993.

32. Agency for Toxic Substances and Disease Registry. ATSDR Record of Activity for telephone conversation with EPA Drinking Water Hotline. January 26, 1994.

33. Weston Inc. Remedial investigation report, ABC One Hour Cleaners, Jacksonville, North Carolina. November 1992.

34. McKone TE. Human exposure to volatile organic compounds in household tap water: the indoor inhalation pathway. Environ Sci Technol 1987;21:1194-1201.

35. Biomedical and Environmental Information Analysis, Health and Safety Research Division, Oak Ridge National Laboratory. The installation restoration program toxicology guide, volume 1. 1989.

Summary of Site Evaluations (Continued)

Operable Unit	Site Number	Site Name	Contaminated Media[1]					Evaluations
			Ground water	Soil	Surface Water	Sediment	Food Chain	
-	22	Industrial Area Tank Farm	●	NA	NA	NA	NA	This site was included in the original 22 priority sites. A separate investigation of Hadnot Point Industrial Area was conducted. Therefore, this site is not is not included in the Operable Unit Installation Restoration Program. Groundwater contamination (benzene, etc) was detected in base drinking water supply well 602. That well has not been used since 1984. Groundwater contamination at this site is being monitored and tracked under several base programs.
-	45	Campbell Street Underground Fuel Storage Area	●	NA	●	●	NA	This site was included in the original 22 priority sites. Groundwater, surface water, and sediment contamination at this site is being monitored and tracked under several base programs. contribute to ATSDR's overall concern for potential human health hazards. ATSDR is requesting additional information regarding the follow-up activities at this site and the rationale for this site's exclusion from the IRP.
-	68	Rifle Range Dump	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the landfill. Groundwater well monitoring would ensure that this site is not contributing to the base wide groundwater contamination. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
-	75	MCAS Basketball Court Site	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the site. The geophysical survey, did not detect the presence of any buried objects. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
-	76	MCAS Curtis Road Site	ND	NA	NA	NA	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater at this site indicating that contamination has not migrated from the site. The geophysical survey, did not detect the presence of any buried objects. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.
-	A	MCAS (H) Officers' Housing Area	ND	NA	ND	ND	NA	This site was included in the original 22 priority sites. No contamination was detected in the groundwater or surface water at this site indicating that contamination has not migrated from the site. No further investigations or clean-up activities were recommended in the 1990 Site Summary Report.

1 - Contaminated Media as documented in Site Summary Report, September 1990
2 - Contamination as documented in the Remedial Investigation Report for Operable Unit 2, June 1993.
3 - Contamination not detected as reported in the Status of Installation Restoration Program Activities at Marine Corps Base, Camp Lejeune North Carolina, June 18, 1993.
4 - Information obtained during ATSDR site visit October 1993.
5 - Preliminary Fish Sampling Data received from MCB Camp Lejeune January 1994.

NA - "Not Analyzed", medium not sampled
ND - "Not Detected" medium sampled, contamination was not detected
● - documented contamination in that medium
☐ - ATSDR has requested information regarding these sites, but has not yet received that information.

Sites 22,45,68,75,76, and A were included in the original 22 priority sites, but are not included in the current Installation Restoration Program.
Sites 78,82,43,86,16,65,7,80,3, and 63 were not originally part of the 22 priority sites, but were subsequently added to the IRP for further investigation.

FROM: Aoyama, Stephen ATSDR STAFF

TO: Hossom, Carole

DATE: 06-16-93
TIME: 13:30

CC:
SUBJECT: Camp Lejeune
PRIORITY: R
ATTACHMENTS:

FYI.

[Background]
Benzene confirmed in Well No. 602 from which pumping has been stopped. TCE found in Wells 602, 601, 603, 608, and finished water at Bldg 20, Hadnot Point Water Plant. TCE level in well 603 not of concern at the time. No benzene detected in Bldg 20 finished water. No detections in well 634. Finished and raw water samples should be sampled at Bldg 20 until further notice. Resample wells 601, 603, and 608 to confirm detections. Advised Mr. Cone, BMAIN to shut down wells 601 and 608. (U.S. Marine Corps, 1984 [TCR])

[References]
(U.S. Marine Corps, 1984 [TCR])

U.S. Marine Corps. 1984. Telephone Communication Record (December 6) from Mr. R.E. Alexander, AC/S, Facilities, MCBCL to Mr. Jim Bailey, Chief, LANTDIV Envir Ofc regarding Monitoring of Hadnot Point Water Supply System.

FROM: Aoyama, Stephen

TO: Hossom, Carole

DATE: 06-16-93
TIME: 13:30

CC:
SUBJECT: Camp Lejeune
PRIORITY: R
ATTACHMENTS:

FYI.

[Background]
Benzene confirmed in Well No. 602 from which pumping has been stopped. TCE found in Wells 602, 601, 603, 608, and finished water at Bldg 20, Hadnot Point Water Plant. TCE level in well 603 not of concern at the time. No benzene detected in Bldg 20 finished water. No detections in well 634. Finished and raw water samples should be sampled at Bldg 20 until further notice. Resample wells 601, 603, and 608 to confirm detections. Advised Mr. Cone, BMAIN to shut down wells 601 and 608. (U.S. Marine Corps, 1984 [TCR])

[References]
(U.S. Marine Corps, 1984 [TCR])

U.S. Marine Corps. 1984. Telephone Communication Record (December 6) from Mr. R.E. Alexander, AC/S, Facilities, MCBCL to Mr. Jim Bailey, Chief, LANTDIV Envir Ofc regarding Monitoring of Hadnot Point Water Supply System.

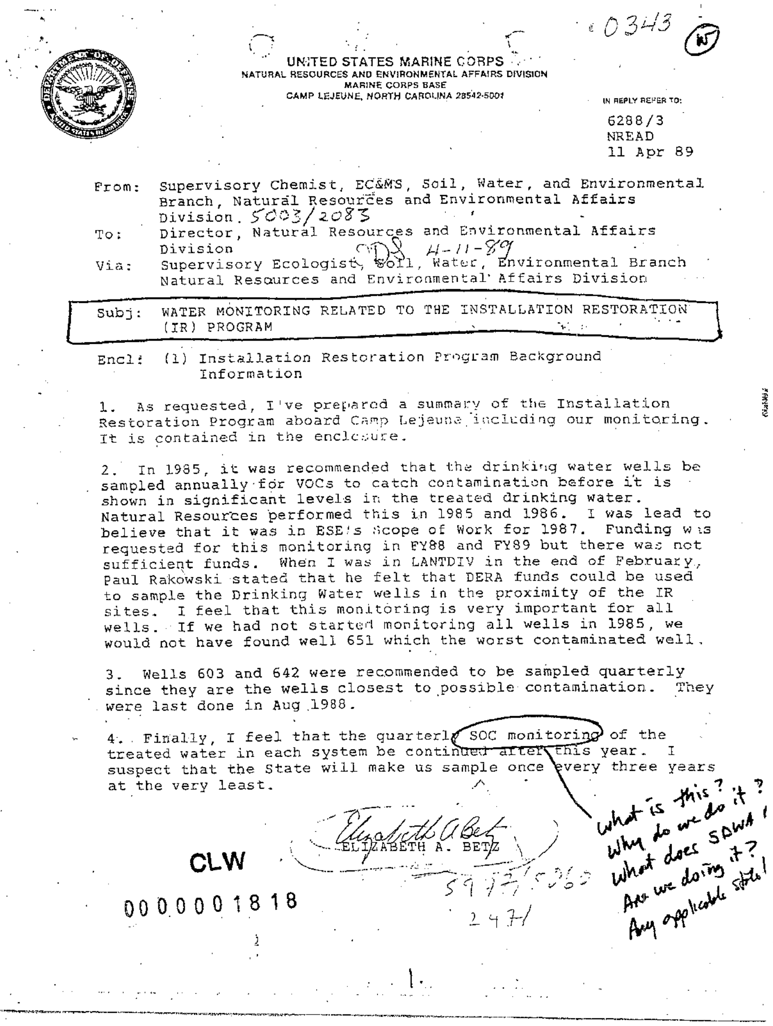
SUPPORTING REFERENCE DOCUMENTS TO ACCOMPANY WRITTEN TESTIMONY OF MR. MICHAEL PARTAIN

Supporting reference documents to accompany written testimony of Mr. Michael Partain

U.S. House of Representatives
Committee on Science & Technology
Subcommittee on Investigations & Oversight

Camp Lejeune: Contamination and Compensation, Looking Back, Moving Forward

September 16, 2010 – 10:00 a.m. to 12:00 p.m.
2138 Rayburn House Office Building



0343 (W)

UNITED STATES MARINE CORPS
NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS DIVISION
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542-5001

IN REPLY REFER TO:
6288/3
NREAD
11 Apr 89

From: Supervisory Chemist, EC&MS, Soil, Water, and Environmental Branch, Natural Resources and Environmental Affairs Division. 5003/2083
To: Director, Natural Resources and Environmental Affairs Division
Via: Supervisory Ecologist, Soil, Water, Environmental Branch Natural Resources and Environmental Affairs Division

ODS 4-11-89

Subj: WATER MONITORING RELATED TO THE INSTALLATION RESTORATION (IR) PROGRAM

Encl: (1) Installation Restoration Program Background Information

1. As requested, I've prepared a summary of the Installation Restoration Program aboard Camp Lejeune including our monitoring. It is contained in the enclosure.

2. In 1985, it was recommended that the drinking water wells be sampled annually for VOCs to catch contamination before it is shown in significant levels in the treated drinking water. Natural Resources performed this in 1985 and 1986. I was lead to believe that it was in ESE's Scope of Work for 1987. Funding was requested for this monitoring in FY88 and FY89 but there was not sufficient funds. When I was in LANTDIV in the end of February, Paul Rakowski stated that he felt that DERA funds could be used to sample the Drinking Water wells in the proximity of the IR sites. I feel that this monitoring is very important for all wells. If we had not started monitoring all wells in 1985, we would not have found well 651 which the worst contaminated well.

3. Wells 603 and 642 were recommended to be sampled quarterly since they are the wells closest to possible contamination. They were last done in Aug 1988.

4. Finally, I feel that the quarterly SOC monitoring of the treated water in each system be continued after this year. I suspect that the State will make us sample once every three years at the very least.

what is this?
Why do we do it?
What does SDWA!
What does it?
Are we doing it?
Any applicable state!

Elizabeth A Betz
ELIZABETH A. BETZ

5977/5060
2471

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INSTALLATION RESTORATION PROGRAM

BACKGROUND INFORMATION

1. In the early 1980's the Navy instituted a program to find any possible "Love Canals" aboard it's facilities. The program was called the Navy Assesment and Control of Installation Pollutants (NACIP). The program had three phases:

   a) Initial Assesment Study (IAS)
   b) Confirmation Study
   c) Remedial Measures

2. Camp Lejeune had a closed Chemical Landfill from the Naval Research Facility that had been located here. Therefore it was one of the first facilities to undergo the IAS which was completed in 1982 by Water and Air Research, Inc. of Gainesville, Florida

3. The IAS for Camp Lejeune discovered 75 abandoned disposal sites aboard the complex. It was decided that 22 of the 75 sites required further study, a confirmation study.

4. In 1984, the Confirmation Study was initiated on the 22 sites at Camp Lejeune by Environmental Science and Engineering, Inc. of Gainsville, Florida. It involved taking soil samples, digging shallow groundwater wells and sampling any existing wells (drinking water wells) in proximity to the sites.

5. On 30 Nov 84, Natural Resources received a call from LANTDIV that said that the initial results of Bldg 602, a drinking water well within a block of the Hadnot Point Fuel Farm, showed Benzene. Bldg 602 well was shut down.

6. On 4 Dec 84, the Hadnot Point Water Treatment Plant's raw and treated water was sampled as well as any drinking water wells within a mile of the Hadnot Point Fuel Farm or Bldg 602. The Bldg numbers sampled were:

601 603 608 634 642

7. On 6 Dec 84, the results were received. Trichloroethylene (TCE), Dichloroethylene (DCE) and Tetrachloroethylene (PCE) were found in the raw and treated water from the Hadnot Point Water Treatment plant and wells 601, 602 and 608. Wells 601 and 608 were shut down.

8. From 10-31 Dec 84, duplicate and quality control samples were run to confirm the presence of TCE, DCE and PCE in the wells. Wells 634 and 637, on the second sampling showed Methylene chloride. The wells were temporarily closed until it was determined that the methylene chloride was probably a laboratory contaminant. It was determined that all drinking water wells would be analyzed for volatile organic chemicals (VOCs) to start in January 1985.

9. 16 Jan 85. 37 wells serving the Hadnot Point and Holcomb Blvd water plants were sampled.
23 Jan 85. 21 wells serving the Onslow Beach, Courthouse Bay, Camp Johnosn and Tarawa Terrace water plants were sampled.

10. On 27 Jan 85, the Chief of Staff of MCB detected a gasoline odor in the water in his quarters, serviced by the Holcomb Blvd water plant.
A fuel line running through the Holcomb blvd reservoir had leaked. The Holcomb Blvd plant was shut down and water was supplied by the Hadnot Point plant. The reservoir was flushed and scrubbed with high pressure hoses. The State of North Carolina was notified.
On 29 Jan 85, The State sampled the finished water at Holcomb Blvd plant and the Chief of Staff's quarters

11. 29 Jan 85. 25 wells serving the Marine corps Air Station, New River and Rifle Range water plants were sampled.

12. The State's results were received on 31 Jan 85, they didn't show any fuel but instead showed levels of TCE. Samples of Hadnot Point Water and Holcomb Blvd water were taken and driven to the State lab.

13. On 1 Feb 85, the 31 Jan 85 samples showed that there was still a contaminated well operating in the Hadnot Point system. The results of the 16 Jan 85 sampling were phoned into Natural Resources and showed high levels of TCE in 651.
Well 651 is located on the back side of DRMO's disposal storage lot. It was not initially sampled as being in proximity to a NACIP site. It had the highest levels of TCE found. The concentration was in the 17,000 to 18,000 ppb range. Well 651 was shut down. Well 634 showed TCE also and was shut down.

Lot 203?

14. On 4 Feb 85, Holcomb Blvd and Hadnot Point plants and distribution systems were flushed and Holcomb Blvd was put back on line.

15. On 7 Feb 85, received results of 23 Jan 85 sampling which showed two wells in the Tarawa Terrace System contaminated with PCE, DCE and TCE. One was a brand new well. These wells were shut down.

16. From 8 Feb ⑧⑤ through 31 March ⑧⑤, more samples and results were received. All drinking water wells were sampled and analyzed for VOCs, if levels were found the well was shut down. This shut down one well at the Rifle Range, one at Marine Corps Air Station, New River, two wells at Tarawa Terrace and eight wells in the Hadnot Point system.

17. The historical data of Tarawa Terrace area did not show any possible sources for the PCE contamination. However across the road from Tarawa Terrace, off Camp Lejeune, were three dry cleaners. The State was brought in. In April 1985, the North Carolina Division of Environmental Management (DEM) sampled the

Tarawa Terrace wells. DEM recommended one well, TT-25, be regularily checked because it was probably the next well to get contaminated. The State initiated a study and determined that ABC Cleaners was the source of the PCE at Tarawa Terrace.

18. From April 1985 to 1987, the Base started monitoring the Hadnot Point and Tarawa Terrace treated water weekly for VOCs and TT-25 monthly.

19. January 1986, Natural Resources sampled all operating drinking water wells for VOCs.

20. The groundwater contamination that had been found in the Industrial Area, indirectly through NACIP, became a site in itself, now bringing the total to 23.

21. The Superfund Amendments Reauthorization Act (SARA) was enacted in 1986. Under SARA Congress established the Defense Environmental Restoration Account (DERA) to fund DOD cleanup sites. SARA also required that federal facilities' programs be consistent with EPA. This meant a revambing of NACIP. It now became the Installation Restoration Program which has three phases:

a) Preliminary Assement/Site Investigation (PA/SI)
b) Remedial Investigaion and Feasibility Study (RI/FS)
c) Record of Decision and Remedial Action (RD/RA)

What was the IAS became the PA/SI. What was the Comfirmation Study became the RI/FS. What was the Remedial Measures now was under part of the RI/FS and the balance was under RD/RA. What it meant to Camp Lejeune was that we now had 23 sites in RI/FS.

22. As the Supervisory Chemist understood it ESE was to sample all the drinking water wells on 1987.

23. Until 1987, the Safe Drinking Water Act and the applicable sections of the North Carolina Administrative Code did not address organic chemicals beyond trihalomethanes or the six listed pesticides. The Safe Drinking Water Act left the requirements for monitoring for the six listed pesticides to the states and North Carolina had not required Camp Lejeune to monitor for them. October 1987, the State initiated Synthetic Organic Chemicals (SOCs) monitoring requirements.

XXX

The SOC regulations require that the sample be analyzed for the eight regulated SOCs and thirty six unregulated SOCs listed in the attachment. Then the system will be sampled every three months for a year for the eight regulated SOCs. If SOC are detected then monitoring will continue until otherwise directed by the State. If SOCs are not detected then monitoring will be done for a year every three or five years, to be determined by the State.

24. During 1987, the Holcomb Blvd expanded system started test operating, which meant that the Tarawa Terrace and Camp Johnson wells and plants were not operated. The expansion was offically

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accepted and the Tarawa Terrace and Camp Johnson plants closed 1 April 1988.

25. To comply with SOC regulations, the Holcomb Blvd, Hadnot Point and Marine Corps Air Station, New River were sampled in December 1987 for both the regulated and unregulated SOCs. They were also sampled in March, May and September 1988 for the regulated SOCs. Nothing was detected above detection levels. In the December 1987 sample from Hadnot Point trichloroethylene was found at 0.2 ppb. The detection level for TCE is 0.5 ppb so what was seen was seen below actually measureable levels.

calibration error?

26. In August 1988, well 603 and 642 were sampled and analyzed for VOCs, since they are the one's closest to the contamination. Nothing was found.

27. In 1988, Camp Lejeune was ranked by the EPA and was added to ehe National Priority List. This makes Camp Lejeune qualify for DERA funds.

28. To put all the water systems at Camp Lejeune on the same schedule all six systems were sampled for both the regulated and unregulated SOCs in March 1989. Nothing was detected above or below detection levels. The systems will be done once a quarter for the rest of the year.

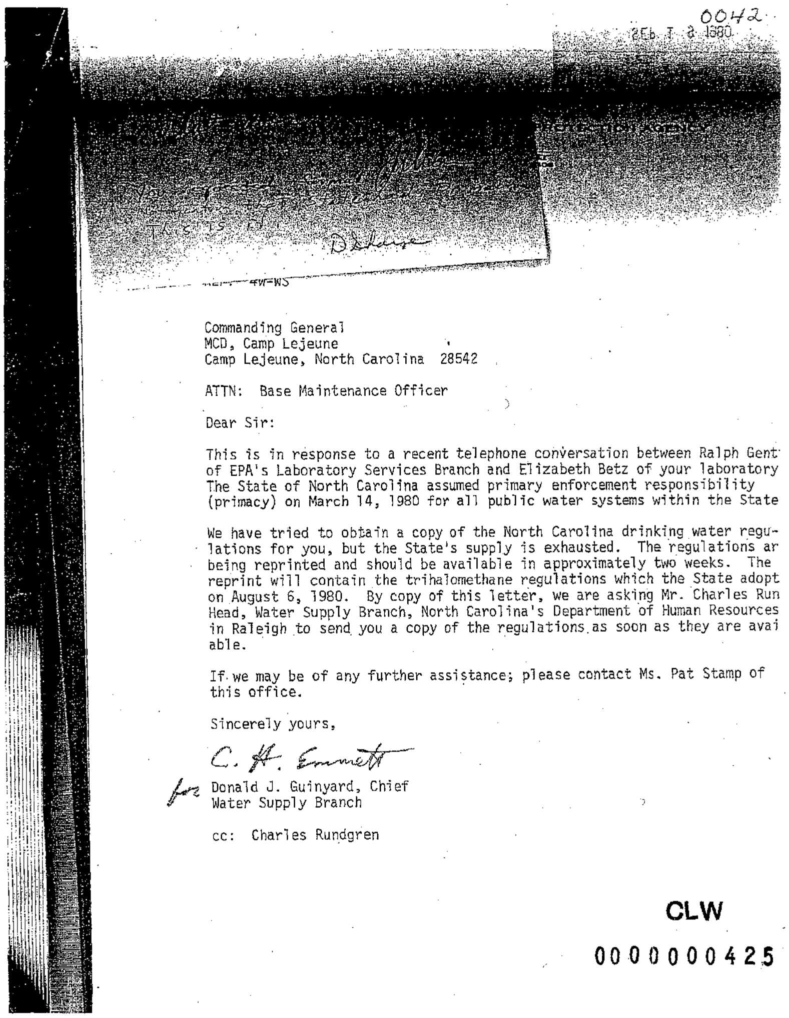
bottom line

both reg + unreg?

REGULATED CONTAMINANTS	MCL
Benzene	0.005 mg/l
Carbon Tetrachloride	0.005 mg/l
1,2-Dichloroethane	0.005 mg/l
Trichloroethylene	0.005 mg/l
para-Dichlorobenzene	0.075 mg/l
1,1-Dichloroethylene	0.007 mg/l
1,1,1-Trichloroethane	0.20 mg/l
Vinyl Chloride	0.002 mg/l

UNREGULATED CONTAMINANTS

Bromobenzene
Bromodichloromethane
Bromoform
Bromomethane
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
o-Chlorotoluene
p-Chlorotoluene
Dibromomethane
m-Dichlorobenzene
o-Dichlorobenzene
trans-1,2-Dichloroethylene
cis-1,2-Dichloroethylene
Dichloromethane
1,1-Dichloroethane
1,1-Dichloropropene
1,2-Dichloropropane
1,3-Dichloropropane
1,3-Dichloropropene
2,2-Dichloropropane
Ethylbenzene
Styrene
1,1,2-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
1,2,3-Trichloropropane
Toluene
p-Xylene
o-Xylene
m-Xylene
Ethylene dibromide (EDB)
1,2-Dibromo-3-Chloropropane (DBCP)



0042

SEP 1 8 1980

This is [illegible]

4W-WS

Commanding General
MCD, Camp Lejeune
Camp Lejeune, North Carolina 28542

ATTN: Base Maintenance Officer

Dear Sir:

This is in response to a recent telephone conversation between Ralph Gent of EPA's Laboratory Services Branch and Elizabeth Betz of your laboratory The State of North Carolina assumed primary enforcement responsibility (primacy) on March 14, 1980 for all public water systems within the State

We have tried to obtain a copy of the North Carolina drinking water regulations for you, but the State's supply is exhausted. The regulations ar being reprinted and should be available in approximately two weeks. The reprint will contain the trihalomethane regulations which the State adopt on August 6, 1980. By copy of this letter, we are asking Mr. Charles Run Head, Water Supply Branch, North Carolina's Department of Human Resources in Raleigh to send you a copy of the regulations as soon as they are avai able.

If we may be of any further assistance, please contact Ms. Pat Stamp of this office.

Sincerely yours,

C. H. Emmett
for Donald J. Guinyard, Chief
Water Supply Branch

cc: Charles Rundgren

0130

Date: 31 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMAintDiv

Subj: LANTNAVFACENGCOM ltr 12 Aug 1982

1. The analysis results enclosed in the letter of 12 August 1982 was initiated by LANTNAVFACENGCOM. Lant Div was concerned that after the State of North Carolina received primacy for the Safe Drinking Water Act, the State might find a problem with the potable water at MCB Camp Lejeune that the Navy had not previously uncovered. With primacy, the State would have the right to sample and run analysis on MCB Camp Lejeune potable water for any parameters under the Safe Drinking Water Act.

2. On 1 October 1980, Lant Div arrived and explained that sampling of all eight systems would be done. One composite sample would be made and a full spectrum analysis would be run. If any parameters showed potential problems, further analysis of the eight individual system samples would be done to locate the source of the problem. Sampling was done by J. H. Parrish, of Lant Div. He was accompanied by Mack Frazelle, of the Water Treatment Section, and Elizabeth Betz, of the Quality Control Lab.

3. The costs of and analysis by Jennings Laboratories were arranged by Lant Div. Results of the analysis were never received by MCB Camp Lejeune. During Wallace Carter's Visit, of 16-18 June 1982, a request was made by Danny Sharpe, of the Environmental Section, for a copy of the 1 October 1980 results.

4. The eight system composite sample showed either none detected, little detected below detectable limits, or at detectable limits for all parameters except for Cadmium and Selenium. Both Cadmium and Selenium were below the 0.010 mg/l maximun contaminant level required by the Safe Drinking Water Act.

5. The only question I have is how did Lant Div arrive at the volumes to use in making the composite sample. The percent of total volume used is not directly related to the percent of the total Camp Lejeune population served or the ~~percent of~~ daily flows of each system.

6. In Summary, the 1980 analysis shows no problems for the priority pollutants listed for the eight systems at MCB Camp Lejeune as a whole. Let me point out that this may not hold true for each system individually. The 1980 analysis, for example, showed none detected for the 4 trihalomethanes (chloroform, Dichlorobromomethane, chlorodibromomethane & bromoform) overall and other more recent analysis shows the New River Air Station system at the maximum contaminant level.

Elizabeth A. Betz

Elizabeth A. Betz
Supervisory Chemist

Composite Samples from
1 OCT 1980 of
Drinking Water.

No recommended action
From Lant DIV. See No reason
Not to Concure Sharpe

Doc. No.: CLCJ-00248-1.02-10/31/80 0044

JENNINGS LABORATORIES, INC.
ANALYTICAL AND CONSULTING CHEMISTS
1118 CYPRESS AVENUE • P. O. BOX 851 • VIRGINIA BEACH, VA. 23451 • PHONE (804) 425-1498

VA (EPA) CERTIFIED LABORATORY for Drinking Water Analysis - Microbiological, Inorganic and Organic

ASBESTOS ANALYSIS – NIOSH 582

Official Referee Chemists for:
AMERICAN OIL CHEMISTS SOCIETY
NATIONAL SOYBEAN PROCESSORS ASSOCIATION.

Laboratory Certified by VA. STATE WATER CONTROL BOARD for Analysis of Effluents for NPDES PERMITS
CERTIFIED OFFICIAL U.S.D.A. LABORATORY FOR MEAT ANALYSIS

CERTIFICATE OF ANALYSIS

TO: Mr. Dave Goodwin
Building N-23 Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 23511

DATE: October 31, 1980

SAMPLE OF WATER SAMPLES (8) FOR COMPOSITE FOR PRIORITY POLLUTANT SCAN

MARKED Listed below

Samples picked up October 1, 1980

OFFICIAL SAMPLE BY:

EIGHT (8) SAMPLES OF WATER TO BE COMPOSITED AS PER INSTRUCTIONS:

Pump house or tapwater

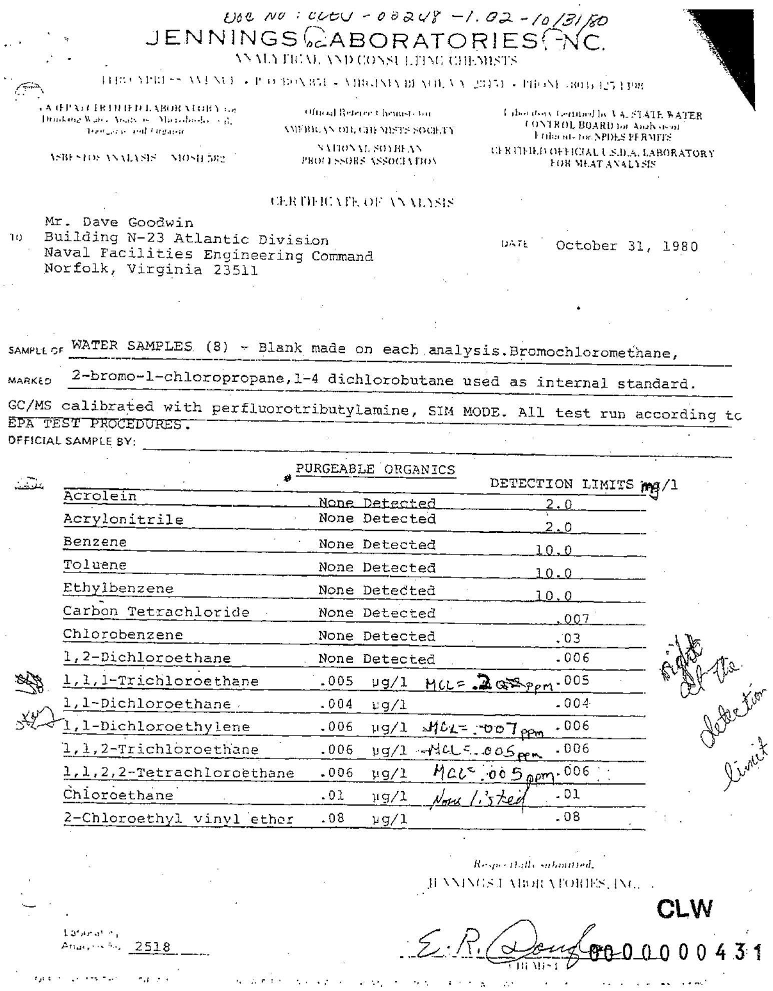
SAMPLE MARKED	QUARTS	LOCATION	QUANTITY
#1	2	Hadnot Point Bldg 20	1552 ml
#2	1	Hadnot Point Bldg 670	708 ml
#3	1	Tarawa Terrace TT-38	452 ml
#4	1	Monford Point M-178	220 ml
#5	1	MCAS(H) Bldg 110	664 ml
#6	1	Courthouse Bay BB-190	132 ml
#7	1	Rifle Range RR-85	220 ml
#8	1	Onslow Beach BA-138	52 ml
			4000 ml

Administrative Record May 11, 1992
Section 1.0
Site 12 in vol A, B

Respectfully submitted,
JENNINGS LABORATORIES, INC.

E. R. Pauley
CHEMIST

Laboratory Analysis No. 2518



Doc No: CLCU-00248-1.02-10/31/80

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EPA CERTIFIED LABORATORY for Drinking Water Analysis Microbiological, Inorganic and Organic
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CERTIFIED OFFICIAL U.S.D.A. LABORATORY FOR MEAT ANALYSIS

CERTIFICATE OF ANALYSIS

TO Mr. Dave Goodwin
Building N-23 Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 23511

DATE October 31, 1980

SAMPLE OF WATER SAMPLES (8) - Blank made on each analysis. Bromochloromethane,
MARKED 2-bromo-1-chloropropane, 1-4 dichlorobutane used as internal standard.
GC/MS calibrated with perfluorotributylamine, SIM MODE. All test run according to EPA TEST PROCEDURES.
OFFICIAL SAMPLE BY:

PURGEABLE ORGANICS				DETECTION LIMITS mg/l
Acrolein	None Detected			2.0
Acrylonitrile	None Detected			2.0
Benzene	None Detected			10.0
Toluene	None Detected			10.0
Ethylbenzene	None Detected			10.0
Carbon Tetrachloride	None Detected			.007
Chlorobenzene	None Detected			.03
1,2-Dichloroethane	None Detected			.006
1,1,1-Trichloroethane	.005	µg/l	MCL= .2 ppm	.005
1,1-Dichloroethane	.004	µg/l		.004
1,1-Dichloroethylene	.006	µg/l	MCL= .007 ppm	.006
1,1,2-Trichloroethane	.006	µg/l	MCL= .005 ppm	.006
1,1,2,2-Tetrachloroethane	.006	µg/l	MCL= .005 ppm	.006
Chloroethane	.01	µg/l	None listed	.01
2-Chloroethyl vinyl ether	.08	µg/l		.08

right at the detection limit

Respectfully submitted,
JENNINGS LABORATORIES, INC.

Laboratory Analysis No. 2518

E. R. Doug
CHEMIST

CLW 0000000431

Doc No: CLEJ-00248 - 1.02 - 10/31/80

[illegible] LABORATORIES, INC.

PURGEABLE ORGANICS (continued)

				DETECTION LIMITS µg/l
Chloroform	None Detected			.010
1,2-Dichloropropane	None Detected			.004
1,3-Dichloropropane	None Detected			.006
Methylene Chloride	None Detected			.010
Methyl Chloride	None Detected			.009
Methyl Bromide	None Detected			.03
Bromoform	None Detected			.02
Dichlorobromomethane	None Detected			.006
Trichlorofluoromethane	None Detected			.03
Dichlorodifluoromethane	None Detected			.01
Chlorodibromomethane	None Detected			.01
Tetrachloroethylene	None Detected			.007
Trichloroethylene	.005	µg/l	.005 = MCL	.005
Vinyl Chloride	.01	µg/l	.002 = MCL	.01
1,2-trans-Dichloroethylene	.006	µg/l	.100 = MCL	.006
bis(chloromethyl)ether	.003	µg/l	2.0×10^{-7} = MCL	.003

BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS

1,2-Dichlorobenzene	None Detected	.04
1,3-Dichlorobenzene	None Detected	.04
1,4-Dichlorobenzene	None Detected	.04
Hexachloroethane	None Detected	.001
Hexachlorobutadiene	None Detected	.001
Hexachlorobenzene	None Detected	.002
1,2,4-Trichlorobenzene	None Detected	.006
Bis(2-Chloroethoxy)methane	None Detected	.40
Naphthalene	None Detected	.04
2-Chloronaphthalene	None Detected	.04
Isophorone	None Detected	5.0
Nitrobenzene	None Detected	5.0
2,4-Dinitrotoluene	None Detected	.06
2,6-Dinitrotoluene	None Detected	.06

LAB # 2518

BY: E. R.
CHEMIST

LE (3) 10/01/80

JENNINGS LABORATORIES, INC.

BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (continued)

		DETECTION LIMIT μg/l
4-Bromophenyl phenyl ether	None Detected	1.1
bis(2-Ethylhexyl)phthalate	None Detected	.02
Di-n-octyl phthalate	None Detected	.11
Dimethyl phthalate	None Detected	.11
Diethyl phthalate	None Detected	.13
Di-n-butyl phthalate	None Detected	.02
Fluorene	None Detected	.04
Fluoranthene	None Detected	.04
Chrysene	None Detected	.04
Pyrene	None Detected	.04
Phenathrene	None Detected	.04
Anthracene	None Detected	.04
Benzo(a)anthracene	None Detected	.04
Benzo(b)fluoranthene	None Detected	.04
Benzo(k)fluoranthene	None Detected	.04
Benzo(a)pyrene	None Detected	.04
Ideno(1,2,3-c,d)pyrene	None Detected	.10
Dibenzo(a,h)anthracene	None Detected	.10
Benzo(g,h,i)perylene	None Detected	.10
4-Chlorophenyl phenyl ether	None Detected	2.2
3,3'-Dichlorobenzidine	None Detected	.04
Benzidine	None Detected	.04
Bis(2-Chloroethyl)ether	None Detected	.04
1,2-Diphenylhydrazine	None Detected	.04
Hexachlorocyclopentadiene	None Detected	.04
N-Nitrosodiphenylamine	None Detected	1.0
Acenaphthylene	None Detected	.04
Acenaphthene	None Detected	.04
Butyl benzyl phthalate	None Detected	.04
N-Nitrosodimethylamine	None Detected	.2
N-Nitrosodi-n-propylamine	None Detected	.5
bis(2-Chloroisopropyl) ether	None Detected	.9

CLW

LAB # 2518

BY E. R. Douglas
Chemist

Doc No: CLEJ-00248-1.02-10/31/80

JENNINGS LABORATORIES, INC.

PESTICIDES/PCB's (Continued)		DETECTION LIMITS µg/l
Aroclor 1016	None Detected	.04
Aroclor 1221	None Detected	.10
Aroclor 1232	None Detected	.10
Aroclor 1242	None Detected	.06
Aroclor 1248	None Detected	.08
Aroclor 1254	None Detected	.08
Aroclor 1260	None Detected	.15
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	None Detected	.003

METALS			DETECTION LIMITS mg/l
Antimony	0.2	mg/l	0.2
Arsenic	<0.002	mg/l	0.002
Beryllium	<0.005	mg/l	0.005
Cadmium	0.006	mg/l	0.002
Chromium	<0.02	mg/l	0.02
Copper	<0.01	mg/l	0.01
Lead	<0.005	mg/l	0.005
Mercury	<0.002	mg/l	0.002
Nickel	<0.02	mg/l	0.02
Selenium	0.008	mg/l	0.002
Silver	<0.01	mg/l	0.01
Thallium	<0.1	mg/l	0.1
Zinc	0.005	mg/l	0.005

MISCELLANEOUS		
Total Cyanides	None Detected	0.01
Asbestos (fibrous)	None Detected	
Total Phenols	None Detected	0.005

LAB# 2518

BY ______________________
CHEMIST

CLW

[illegible] 10/31/80

JENNINGS LABORATORIES, INC.

ACID EXTRACTABLE ORGANIC COMPOUNDS

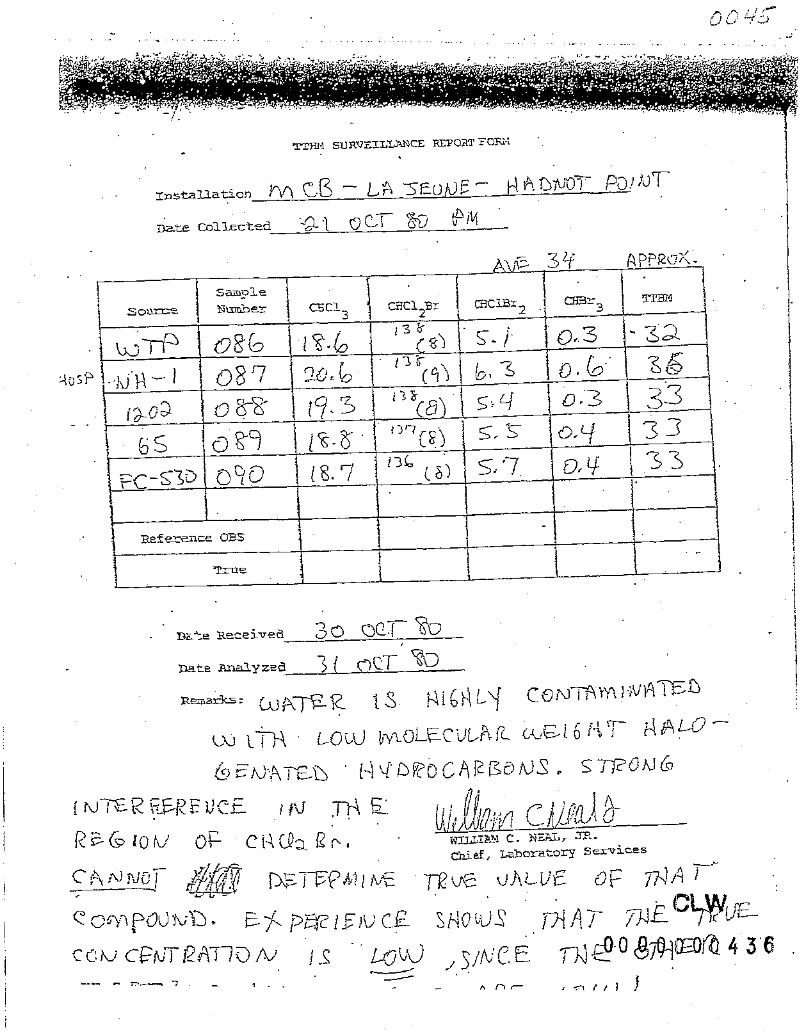
		DETECTION LIMITS μg/l
Phenol	NONE DETECTED	1.4
2-Nitrophenol	None Detected	2.5
4-Nitrophenol	None Detected	2.5
2,4-Dinitrophenol	None Detected	7.0
4,6-Dinitro-o-cresol	None Detected	2.0
Pentachlorophenol	None Detected	10.0
p-Chloro-m-cresol	None Detected	.01
2-Chlorophenol	None Detected	2.0
2,4-Dichlorophenol	None Detected	2.1
2,4,6-Trichlorophenol	None Detected	3.0
2,4-Dimethylphenol	None Detected	1.7

PESTICIDES/PCB's

α-Endosulfan	None Detected	.005
β-Endosulfan	None Detected	.01
Endosulfan sulfate	None Detected	.03
α-BHC	None Detected	.002
β-BHC	None Detected	.004
δ-BHC	None Detected	.004
γ-BHC	None Detected	.002
Aldrin	None Detected	.003
Dieldrin	None Detected	.006
4,4'-DDE	None Detected	.006
4,4'-DDD	None Detected	.012
4,4'-DDT	None Detected	.016
Endrin	None detected	.009
Endrin Aldehyde	None Detected	.023
Heptachlor	None Detected	.002
Heptachlor Epoxide	None Detected	.004
Chlordane	None Detected	.04
Toxaphene	None Detected	.40

LAB # 2518

BY E. R. Douglas
CHEMIST



0045

TTHM SURVEILLANCE REPORT FORM

Installation MCB - LA JEUNE - HADNOT POINT

Date Collected 21 OCT 80 PM

AVE 34 APPROX.

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	TTHM
WTP	086	18.6	138 (8)	5.1	0.3	32
HOSP NH-1	087	20.6	138 (9)	6.3	0.6	36
1202	088	19.3	138 (8)	5.4	0.3	33
65	089	18.8	137 (8)	5.5	0.4	33
FC-530	090	18.7	136 (8)	5.7	0.4	33
Reference OBS						
True						

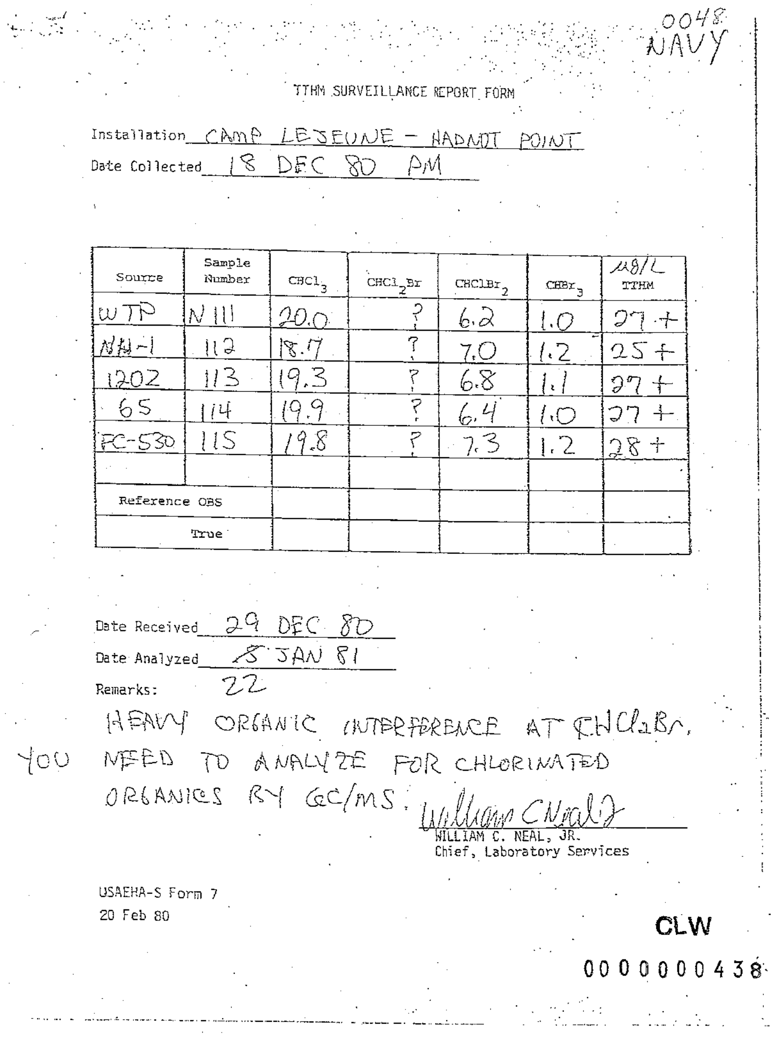
Date Received 30 OCT 80

Date Analyzed 31 OCT 80

Remarks: WATER IS HIGHLY CONTAMINATED WITH LOW MOLECULAR WEIGHT HALOGENATED HYDROCARBONS. STRONG INTERFERENCE IN THE REGION OF $CHCl_2Br$.

William C Neal Jr
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

CANNOT DETERMINE TRUE VALUE OF THAT COMPOUND. EXPERIENCE SHOWS THAT THE TRUE CONCENTRATION IS LOW, SINCE THE



0048
NAVY

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LEJEUNE - HADNOT POINT
Date Collected 18 DEC 80 PM

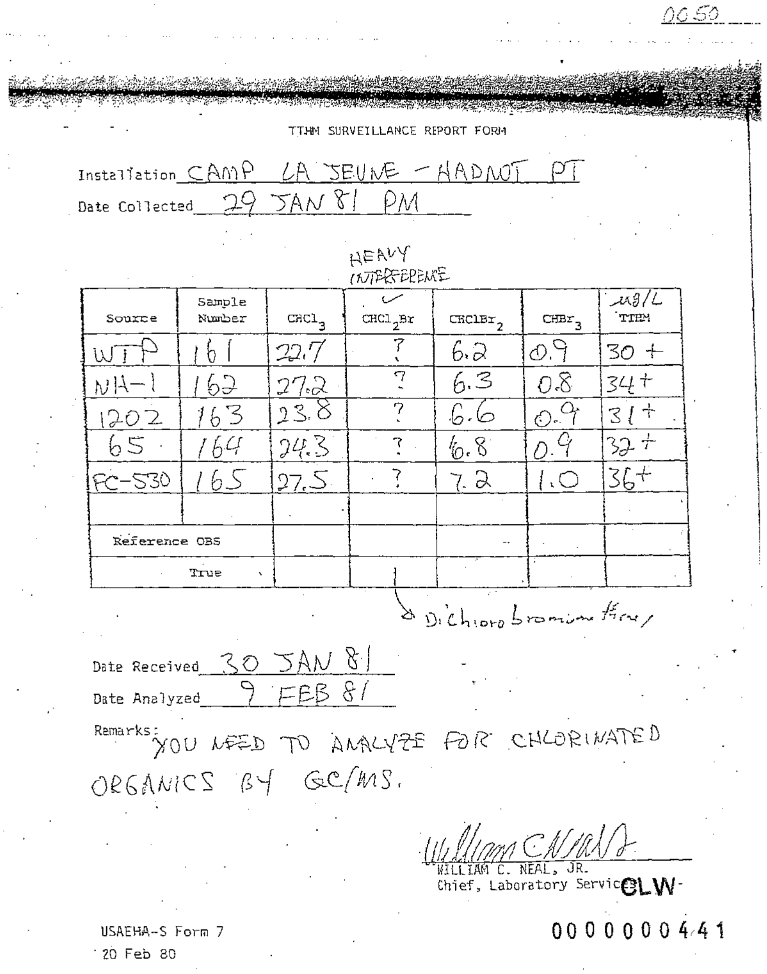
Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	µg/L TTHM
WTP	N 111	20.0	?	6.2	1.0	27 +
NH-1	112	18.7	?	7.0	1.2	25 +
1202	113	19.3	?	6.8	1.1	27 +
65	114	19.9	?	6.4	1.0	27 +
FC-530	115	19.8	?	7.3	1.2	28 +
Reference OBS						
True						

Date Received 29 DEC 80
Date Analyzed 8 JAN 81
Remarks: 22

HEAVY ORGANIC INTERFERENCE AT $CHCl_2Br$. YOU NEED TO ANALYZE FOR CHLORINATED ORGANICS BY GC/MS. William C Neal Jr

WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80



00 50

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LA JEUNE - HADNOT PT

Date Collected 29 JAN 81 PM

HEAVY INTERFERENCE

Source	Sample Number	$CHCl_3$	✓ $CHCl_2Br$	$CHClBr_2$	$CHBr_3$	ug/L TTHM
WTP	161	22.7	?	6.2	0.9	30 +
NH-1	162	27.2	?	6.3	0.8	34+
1202	163	23.8	?	6.6	0.9	31+
65	164	24.3	?	6.8	0.9	32+
FC-530	165	27.5	?	7.2	1.0	36+
Reference OBS						
True						

DiChloro bromomethane

Date Received 30 JAN 81

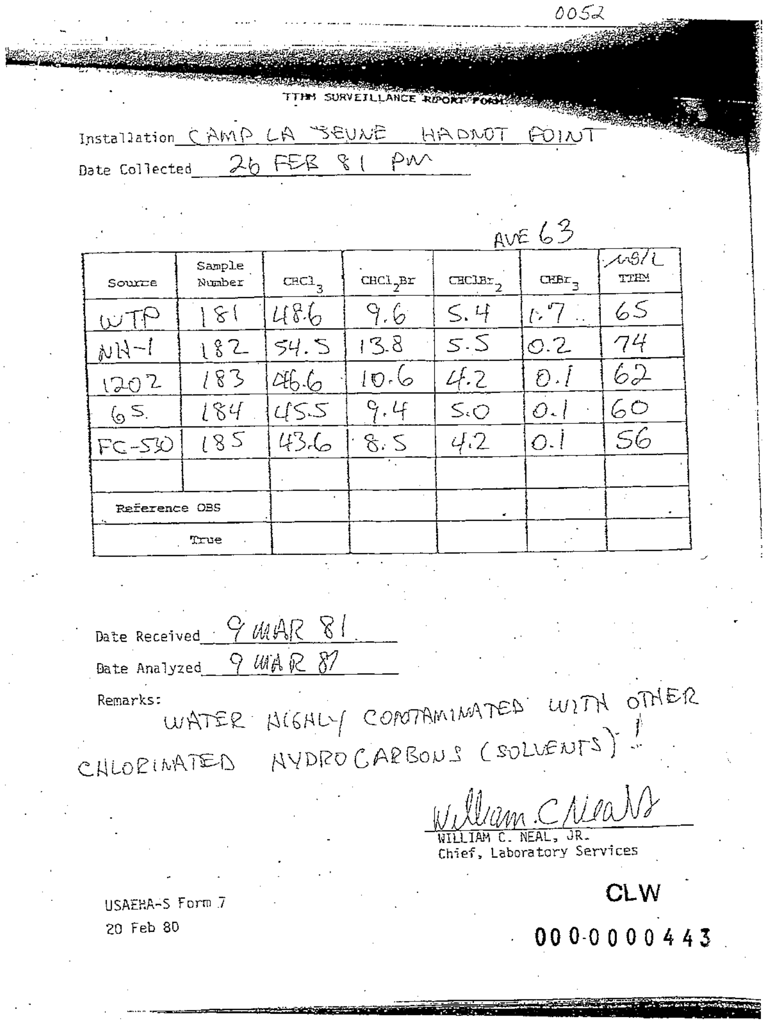
Date Analyzed 9 FEB 81

Remarks: YOU NEED TO ANALYZE FOR CHLORINATED ORGANICS BY GC/MS.

William C Neal Jr

WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80



TTHM SURVEILLANCE REPORT FORM

Installation CAMP LA JEUNE HADNOT POINT

Date Collected 26 FEB 81 PM

AVE 63

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	ug/L TTHM
WTP	181	48.6	9.6	5.4	1.7	65
NH-1	182	54.5	13.8	5.5	0.2	74
1202	183	46.6	10.6	4.2	0.1	62
65	184	45.5	9.4	5.0	0.1	60
FC-530	185	43.6	8.5	4.2	0.1	56
Reference OBS						
True						

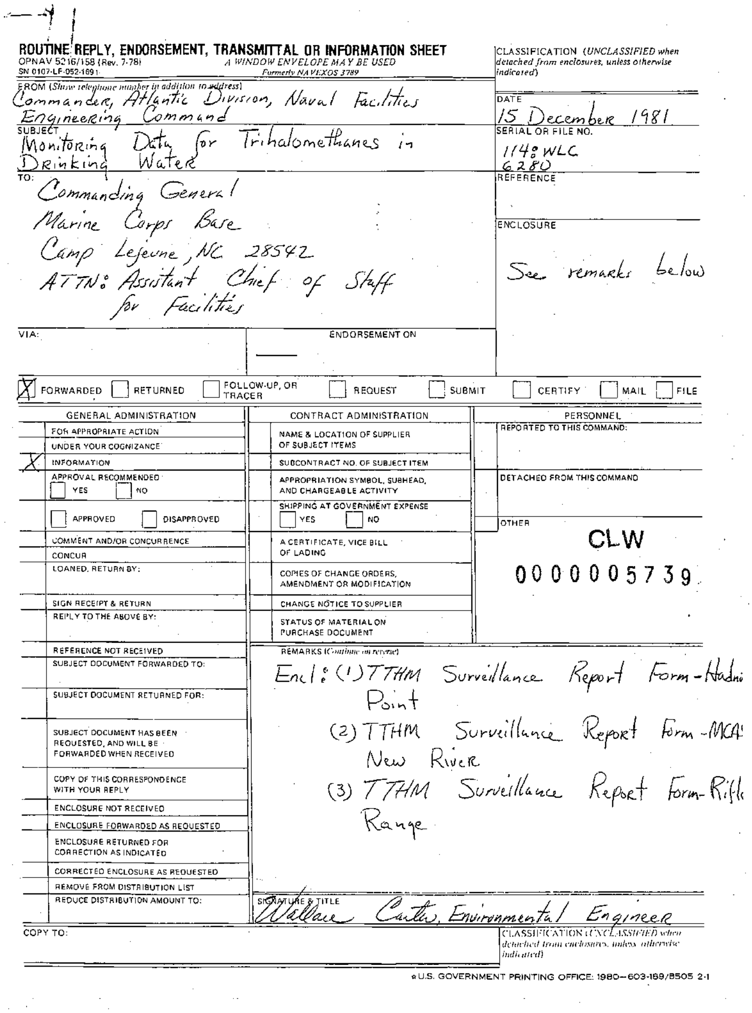
Date Received 9 MAR 81

Date Analyzed 9 MAR 81

Remarks: WATER HIGHLY CONTAMINATED WITH OTHER CHLORINATED HYDROCARBONS (SOLVENTS) !

William C Neal Jr
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80



ROUTINE REPLY, ENDORSEMENT, TRANSMITTAL OR INFORMATION SHEET
OPNAV 5216/158 (Rev. 7-78)
SN 0107-LF-052-1691
A WINDOW ENVELOPE MAY BE USED
Formerly NAVEXOS 3789

CLASSIFICATION (*UNCLASSIFIED when detached from enclosures, unless otherwise indicated*)

FROM (*Show telephone number in addition to address*)
Commander, Atlantic Division, Naval Facilities Engineering Command

DATE
15 December 1981

SUBJECT
Monitoring Data for Trihalomethanes in Drinking Water

SERIAL OR FILE NO.
114:WLC
6280

TO:
Commanding General
Marine Corps Base
Camp Lejeune, NC 28542
ATTN: Assistant Chief of Staff
for Facilities

REFERENCE

ENCLOSURE
See remarks below

VIA:

ENDORSEMENT ON

☒ FORWARDED ☐ RETURNED ☐ FOLLOW-UP, OR TRACER ☐ REQUEST ☐ SUBMIT ☐ CERTIFY ☐ MAIL ☐ FILE

GENERAL ADMINISTRATION

- ☐ FOR APPROPRIATE ACTION
- ☐ UNDER YOUR COGNIZANCE
- ☒ INFORMATION
- ☐ APPROVAL RECOMMENDED ☐ YES ☐ NO
- ☐ APPROVED ☐ DISAPPROVED
- ☐ COMMENT AND/OR CONCURRENCE
- ☐ CONCUR
- ☐ LOANED, RETURN BY:
- ☐ SIGN RECEIPT & RETURN
- ☐ REPLY TO THE ABOVE BY:
- ☐ REFERENCE NOT RECEIVED
- ☐ SUBJECT DOCUMENT FORWARDED TO:
- ☐ SUBJECT DOCUMENT RETURNED FOR:
- ☐ SUBJECT DOCUMENT HAS BEEN REQUESTED, AND WILL BE FORWARDED WHEN RECEIVED
- ☐ COPY OF THIS CORRESPONDENCE WITH YOUR REPLY
- ☐ ENCLOSURE NOT RECEIVED
- ☐ ENCLOSURE FORWARDED AS REQUESTED
- ☐ ENCLOSURE RETURNED FOR CORRECTION AS INDICATED
- ☐ CORRECTED ENCLOSURE AS REQUESTED
- ☐ REMOVE FROM DISTRIBUTION LIST
- ☐ REDUCE DISTRIBUTION AMOUNT TO:

CONTRACT ADMINISTRATION

- ☐ NAME & LOCATION OF SUPPLIER OF SUBJECT ITEMS
- ☐ SUBCONTRACT NO. OF SUBJECT ITEM
- ☐ APPROPRIATION SYMBOL, SUBHEAD, AND CHARGEABLE ACTIVITY
- ☐ SHIPPING AT GOVERNMENT EXPENSE ☐ YES ☐ NO
- ☐ A CERTIFICATE, VICE BILL OF LADING
- ☐ COPIES OF CHANGE ORDERS, AMENDMENT OR MODIFICATION
- ☐ CHANGE NOTICE TO SUPPLIER
- ☐ STATUS OF MATERIAL ON PURCHASE DOCUMENT

PERSONNEL

- ☐ REPORTED TO THIS COMMAND:
- ☐ DETACHED FROM THIS COMMAND
- ☐ OTHER

CLW
0000005739

REMARKS (*Continue on reverse*)
Encl: (1) TTHM Surveillance Report Form-Hadn
Point
(2) TTHM Surveillance Report Form-MCA
New River
(3) TTHM Surveillance Report Form-Rifl
Range

SIGNATURE & TITLE
Wallace Carter, Environmental Engineer

COPY TO:

CLASSIFICATION (*UNCLASSIFIED when detached from enclosures, unless otherwise indicated*)

⋆U.S. GOVERNMENT PRINTING OFFICE: 1980—603-189/8505 2-1

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LEJEUNE - HADNOT PT.

Date Collected 21 AUG 81 AM

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	TTHM
WTP 20	521	27.8	INTERFERENCE	3.2	0.1	31 +
NH-1	522	38.2	ON	3.3	0.2	42 +
1202	523	29.3	THIS	2.9	0.1	32 +
65	524	27.7	PEAK	3.2	0.1	31 +
530	525	32.2	↓	3.4	0.1	36 +
Reference OBS						
True						

Date Received 24 AUG 81

Date Analyzed 4 DEC 81

Remarks:

William C Neal
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80

NAVY

TTHM SURVEILLANCE REPORT FORM

Installation MCAS – NEW RIVER

Date Collected 19 AUG 81 PM

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	TTHM
WTP 110	516	SEPTUM INVERTED				—
6-520	517	42.5	33.3	40.7	37.9	154
4025	578	SEPTUM INVERTED				—
710	519	45.3	31.9	38.7	20.1	116
2800	520	48.6	33.4	41.1	24.6	148
Reference OBS						
True						

Date Received 24 AUG 81

Date Analyzed 7 DEC 81

Remarks:

William C Neal Jr

WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80

[illegible]

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LE JEUNE - RIFLE RANGE

Date Collected 20 AUG 81

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	TTHM
P-Cl_2 WTP	466	7.4	<0.1	0.2	<0.1	8
A-Cl_2 WTP	467	50.4	27.4	19.6	2.3	100
6	468	48.9	27.5	20.7	2.5	100
10	469	46.7	26.9	21.6	2.3	98
92	470	48.3	27.2	20.1	2.0	98
Reference OBS						
True						

Date Received 24 AUG 81

Date Analyzed 7 DEC 81

Remarks:

William C Neal Jr
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80

[illegible] (3)

OPNAV 5216/144 (REV. 6-70)
S/N 0107-LF-778-8099
DEPARTMENT OF THE NAVY

Memorandum

DATE: 23 July 1981

FROM Ms. Betz, Quality Control Lab, Environmental Branch, NREAD, BMaintDept

TO Mr. Sharpe, Supvy Ecologist, Environmental Branch, NREAD, BMaintDept

SUBJ Trihalomethane Sampling for the Rifle Range Water Treatment System.

1. On Monday, 20 July 1881, Jerry Wallmeyer, of NAVFACENGCOM, called concerning water samples being collected from Hadnot Point and Marine Corps Air Station Water Systems for Trihalomethanes. He asked who ran the analysis and what procedures were used. He said he was going to try and arrange with Wallace Carter to have trihalomethanes collected at the Rifle Range Water System.

2. The reason for the sampling on the Rifle Range has to do with the results obtained in connection with the Chemical Dump.

3. On Tuesday, 21July 1981, Jerry Wallmeyer called to say everything was set with the Army Lab who runs the analysis and that starting in August we would receive containers for the Rifle Range. Jerry asked if we had any spare samplesbottles. I said we had about 4. He asked that with the extra bottles we had, we should take as many samples at the Rifle Range for July.

4. Jerry Wallmeyer, Also stated that he wanted one sample taken where the raw water enters the plant while the wells were pumping. He also wanted one sample from the treated water tap at the plant, one from the furthest away from the plant and two in the middle of the distribution system as the regulations callfor.

5. I called the assist. Foreman atbthe Water Treatment Branch and asked what point was the furthest away and two good points for the distribution. The Sewage Plant is the furthest away. Mack also suggested the Fire Station and the Snack Bar as for the two points for the distribution system.

Elizabeth A. Betz

Elizabeth A. Betz
Supervisory Chemist

confirmation
01.02-03/06/81-00226

ACTIVITY C.Le.J

UIC ______

SITE NUMBER 1

SECTION III. DETAILED DISPOSAL INFORMATION ~~[illegible]~~ 69

> This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. Is this disposal site currently in operation or has it been closed? ______

Years of operation: From early to mid-1950's To ~1976

2. What is/was the name of the site (e.g., slurry pit)?
Rifle Range Chemical Dump

3. Where is/was the site located (provide a description and give activity map coordinates)?
Approximately 3 miles east south east of the intersection of US 17 and NC highway 210 at map coordinates 770290.

4. ~~Describe how the site is/was operated.~~ found chemical agent (gas) testing kits; malathion ~~dump~~ drum (55 gal empty); blank rifle cartridges (fired and unfired) from apparent War Games; report of chemical mist on foggy morning that caused choking ~~gas~~ symptoms, and ~~for~~ possible death of 2 oppossums; report of fire-break equipment operator who, upon unearthing material that formed a white cloud of dust(?), ~~was~~ left his equipment and the immediate area because he was choking; area recently burned over during a managed burn(?); holes and depressions are forming in the area possibly due to detioration of buried material (see #12)

OVER

(Continued) WA
MH CF

(4 CONT.) Metal containers of waste material generally placed in the bottom of trenches dug for this purpose with a backhoe. Trenches were dug as deep as possible, 10 ft ± .

ACTIVITY ____________________

UIC __________

SITE NUMBER __________

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure procedures.

— sandy ~~site~~ soils, c̄ moderate slope

— CW training vials

— younger trees in reported area of fill.

6. As well as possible, describe the wastes that entered the site. see attached memo

~~Type of Waste~~ ~~Quantity~~ ~~Origin~~

During the visit in March at Camp Lejeune Wallace Eakes contacted Mr. Don Tallman in Florida and Mr. Ed Carper who now lives in Indiana. Mr. Carper did not have much information. Most came from Don Tallman. As the memo shows there was a plat of area showing lot numbers + chemicals buried, This has been lost.

Wallace, Charlie Fellows + I visited site March 20. We found evidence of materials CF reports on p. 1 of this form. There were a number of old gas testing kits found, but according to EOD specialist Jerome H. Witt none contained any agent. We did see one wooden crate ~12x24 x12" with some white granular powder. The area was vegetated with secondary growth. Evidence of settling also apparent. Plowing for firebreak has turned up old debris. Some evidence that training exercises had taken place in and about dump area. There was no sign of dump across access road. There were signs of training i.e. fox holes etc.

HOP

more.

During IAS visit wells previously installed were sampled by Jerry Wollmeyer from SouthDiv. Samples were to be partially scanned for priority pollutants. High THM values >100 ppb were assumed to be mostly from prechlorination procedures at water plant. Test wells # 15, 16, 17 located at site.

(Continued)

ACTIVITY ____________

UIC CL/NC

SITE NUMBER 1

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

The groundwater movement in this area of moderate slopes and sandy soils will be in several directions and controlled largely by topography. I expect gw is moving to the NW (small creek) and NNW (New River). Some flow is probably to the steep slope on the SE

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

9. Do personnel live or work near the site? Please explain.

ACTIVITY ______

UIC CL/NC

SITE NUMBER 1

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. Have there been any incidents or complaints concerning this site? Explain.

11. How close is the site to the activity's boundaries?

12. Additional comments buried here are: DDT; PCB's in cement septic tank containers in accordance to EPA; one bulldozer operator said he buried drums at various time at least 10 feet below ground level

Reference photographs: Reel 8 (MKH-8) negative #'s 33-37; Reel 9 (MKH-9) negative #'s 1-8 See notes in photo. log.

Also → CRF-1 frames # 11-18 } from ground
CRF-2 " # 8-10 }
CRF-4 " # 4-19 } from air

(Continued)

A memo prepared by Mr. Don Tallman referenced to chemical land fill. at Camp Lejeune.

1969 assumed control from pxxdxxxxx predecessor. Plat of area showing lot numbers and chemicals buried in those lots were listed in the folder (quantity, contents and all amounts buried in area) shadowed in red on plat. This continued until approximately 1973 when correspondence was directed to CG, Attention Assistant Chief of Staff, Facilities from Base Safety Manager requesting guidance and advice as to whether this dump site should continued to be used or to be channeled in another direction, new location, etc. The response to this was to xix continue same procedure and include chemicals from the Air Station.

In 1974, BO5100.13B was published to include Air Station. This procedure continued until 1975-1976. NREA requested all information for review. The folder containing all records was turned over to NREA. The folder was returned. Absent from the folder was the plat and could not be located. At that period, a new plat was developed listing all dxxp deposits of chemical wastes in landfill and was shadowed in red as was the original plat. Sometime later this folder was turned over to Base Maintenance, NREA people upon their request and they assumed control of the chemical disposal area. Since that I have no knowledge ~~knolwedge~~ of what has transpired in that area.

COMMON CHEMICALS buried in the dump were:

DDT - estimated quantity - 50 barrels

Trichlorethylene sludge - estimated quantity unknown

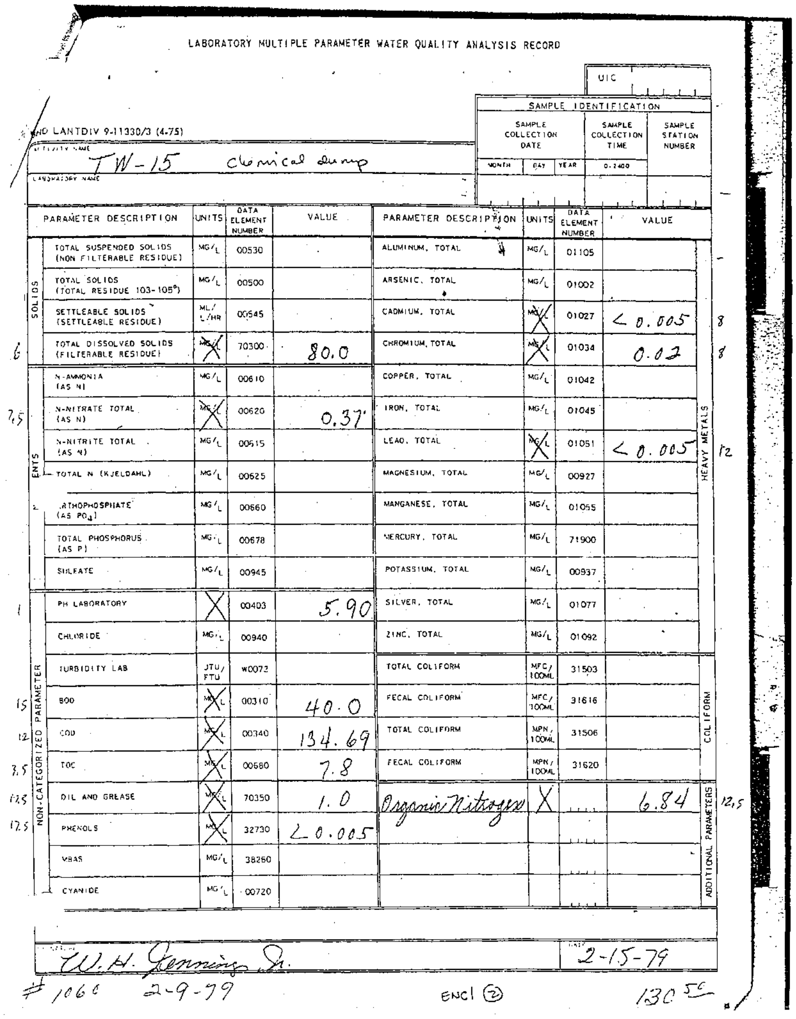
Used VARSOL varisal (cleaning purposes)

Calcium hyp~~t~~ochlori~~d~~te - HTH

Wood preservative (Carpenter Shop) vats emptied in landfill

#2 Fuel oil sludge

PCB - buried in concrete septic tanks, sealed according to instructions from EPA - 3-4 tanks)



LABORATORY MULTIPLE PARAMETER WATER QUALITY ANALYSIS RECORD

UIC

NO LANTDIV 9-11330/3 (4-75)

ACTIVITY NAME: TW-15 Chemical dump

LABORATORY NAME:

SAMPLE IDENTIFICATION				
SAMPLE COLLECTION DATE			SAMPLE COLLECTION TIME	SAMPLE STATION NUMBER
MONTH	DAY	YEAR	0-2400	

		PARAMETER DESCRIPTION	UNITS	DATA ELEMENT NUMBER	VALUE	PARAMETER DESCRIPTION	UNITS	DATA ELEMENT NUMBER	VALUE		
	SOLIDS	TOTAL SUSPENDED SOLIDS (NON FILTERABLE RESIDUE)	MG/L	00530		ALUMINUM, TOTAL	MG/L	01105		HEAVY METALS	
		TOTAL SOLIDS (TOTAL RESIDUE 103-105°)	MG/L	00500		ARSENIC, TOTAL	MG/L	01002			
		SETTLEABLE SOLIDS (SETTLEABLE RESIDUE)	ML/L/HR	00545		CADMIUM, TOTAL	~~MG/L~~	01027	< 0.005		8
6		TOTAL DISSOLVED SOLIDS (FILTERABLE RESIDUE)	~~MG/L~~	70300	80.0	CHROMIUM, TOTAL	~~MG/L~~	01034	0.02		8
	ENTS	N-AMMONIA (AS N)	MG/L	00610		COPPER, TOTAL	MG/L	01042			
7.5		N-NITRATE TOTAL (AS N)	~~MG/L~~	00620	0.37	IRON, TOTAL	MG/L	01045			
		N-NITRITE TOTAL (AS N)	MG/L	00615		LEAD, TOTAL	~~MG/L~~	01051	< 0.005		12
		TOTAL N (KJELDAHL)	MG/L	00625		MAGNESIUM, TOTAL	MG/L	00927			
		ORTHOPHOSPHATE (AS PO_4)	MG/L	00660		MANGANESE, TOTAL	MG/L	01055			
		TOTAL PHOSPHORUS (AS P)	MG/L	00678		MERCURY, TOTAL	MG/L	71900			
		SULFATE	MG/L	00945		POTASSIUM, TOTAL	MG/L	00937			
1	NON-CATEGORIZED PARAMETER	PH LABORATORY	X	00403	5.90	SILVER, TOTAL	MG/L	01077			
		CHLORIDE	MG/L	00940		ZINC, TOTAL	MG/L	01092			
		TURBIDITY LAB	JTU/FTU	W0072		TOTAL COLIFORM	MFC/100ML	31503		COLIFORM	
15		BOD	~~MG/L~~	00310	40.0	FECAL COLIFORM	MFC/100ML	31616			
12		COD	~~MG/L~~	00340	134.69	TOTAL COLIFORM	MPN/100ML	31506			
3.5		TOC	~~MG/L~~	00680	7.8	FECAL COLIFORM	MPN/100ML	31620			
12.5		OIL AND GREASE	~~MG/L~~	70350	1.0	Organic Nitrogen	X		6.84	ADDITIONAL PARAMETERS	12.5
12.5		PHENOLS	~~MG/L~~	32730	< 0.005						
		MBAS	MG/L	38260							
		CYANIDE	MG/L	00720							

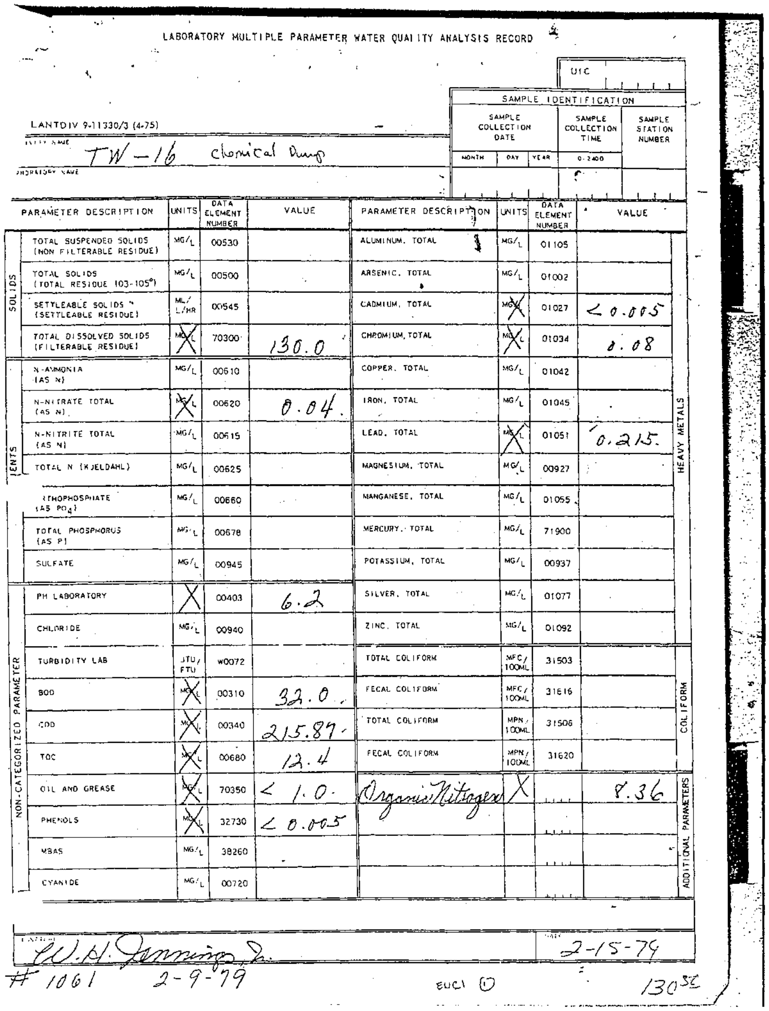
SIGNATURE: W. H. Jennings Jr.

DATE: 2-15-79

1060 2-9-79

ENCL ②

130 5c



LABORATORY MULTIPLE PARAMETER WATER QUALITY ANALYSIS RECORD

UIC

SAMPLE IDENTIFICATION				
SAMPLE COLLECTION DATE			SAMPLE COLLECTION TIME	SAMPLE STATION NUMBER
MONTH	DAY	YEAR	0-2400	

LANTDIV 9-11330/3 (4-75)

[illegible] NAME TW-16 Chemical Dump

LABORATORY NAME

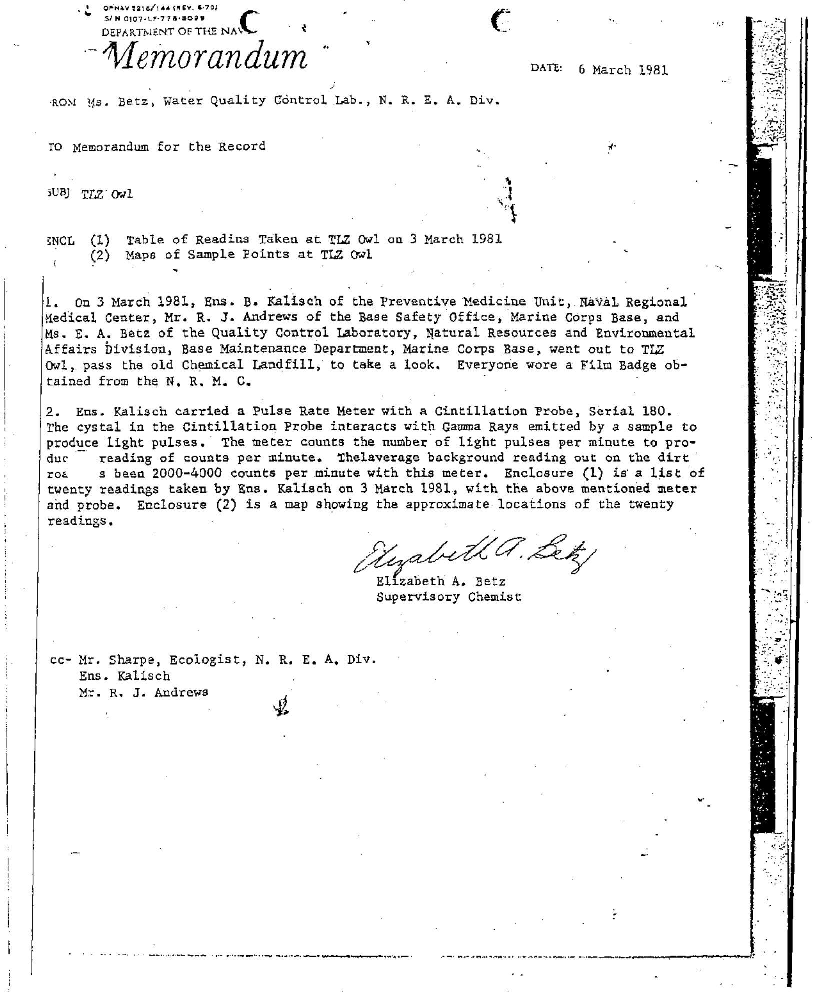
	PARAMETER DESCRIPTION	UNITS	DATA ELEMENT NUMBER	VALUE	PARAMETER DESCRIPTION	UNITS	DATA ELEMENT NUMBER	VALUE	
SOLIDS	TOTAL SUSPENDED SOLIDS (NON FILTERABLE RESIDUE)	MG/L	00530		ALUMINUM, TOTAL	MG/L	01105		HEAVY METALS
	TOTAL SOLIDS (TOTAL RESIDUE 103-105°)	MG/L	00500		ARSENIC, TOTAL	MG/L	01002		
	SETTLEABLE SOLIDS (SETTLEABLE RESIDUE)	ML/L/HR	00545		CADMIUM, TOTAL	X MG/L	01027	< 0.005	
	TOTAL DISSOLVED SOLIDS (FILTERABLE RESIDUE)	X MG/L	70300	130.0	CHROMIUM, TOTAL	X MG/L	01034	0.08	
ENTS	N-AMMONIA (AS N)	MG/L	00610		COPPER, TOTAL	MG/L	01042		
	N-NITRATE TOTAL (AS N)	X MG/L	00620	0.04	IRON, TOTAL	MG/L	01045		
	N-NITRITE TOTAL (AS N)	MG/L	00615		LEAD, TOTAL	X MG/L	01051	0.215	
	TOTAL N (KJELDAHL)	MG/L	00625		MAGNESIUM, TOTAL	MG/L	00927		
	RTHOPHOSPHATE (AS PO_4)	MG/L	00660		MANGANESE, TOTAL	MG/L	01055		
	TOTAL PHOSPHORUS (AS P)	MG/L	00678		MERCURY, TOTAL	MG/L	71900		
	SULFATE	MG/L	00945		POTASSIUM, TOTAL	MG/L	00937		
NON-CATEGORIZED PARAMETER	PH LABORATORY	X	00403	6.2	SILVER, TOTAL	MG/L	01077		
	CHLORIDE	MG/L	00940		ZINC, TOTAL	MG/L	01092		
	TURBIDITY LAB	JTU/FTU	W0072		TOTAL COLIFORM	MFC/100ML	31503		COLIFORM
	BOD	X MG/L	00310	32.0	FECAL COLIFORM	MFC/100ML	31616		
	COD	X MG/L	00340	215.87	TOTAL COLIFORM	MPN/100ML	31506		
	TOC	X MG/L	00680	12.4	FECAL COLIFORM	MPN/100ML	31620		
	OIL AND GREASE	X MG/L	70350	< 1.0	Organic Nitrogen	X		8.36	ADDITIONAL PARAMETERS
	PHENOLS	X MG/L	32730	< 0.005					
	MBAS	MG/L	38260						
	CYANIDE	MG/L	00720						

W. H. Jennings Jr. DATE 2-15-79

1061 2-9-79

EUCI ①

130 SE



OPNAV 5216/144 (REV. 6-70)
S/N 0107-LF-778-8099
DEPARTMENT OF THE NA

Memorandum

DATE: 6 March 1981

ROM Ms. Betz, Water Quality Control Lab., N. R. E. A. Div.

TO Memorandum for the Record

SUBJ TLZ Owl

NCL (1) Table of Readins Taken at TLZ Owl on 3 March 1981
(2) Maps of Sample Points at TLZ Owl

1. On 3 March 1981, Ens. B. Kalisch of the Preventive Medicine Unit, Naval Regional Medical Center, Mr. R. J. Andrews of the Base Safety Office, Marine Corps Base, and Ms. E. A. Betz of the Quality Control Laboratory, Natural Resources and Environmental Affairs Division, Base Maintenance Department, Marine Corps Base, went out to TLZ Owl, pass the old Chemical Landfill, to take a look. Everyone wore a Film Badge obtained from the N. R. M. C.

2. Ens. Kalisch carried a Pulse Rate Meter with a Cintillation Probe, Serial 180. The cystal in the Cintillation Probe interacts with Gamma Rays emitted by a sample to produce light pulses. The meter counts the number of light pulses per minute to produc reading of counts per minute. Thelaverage background reading out on the dirt roa s been 2000-4000 counts per minute with this meter. Enclosure (1) is a list of twenty readings taken by Ens. Kalisch on 3 March 1981, with the above mentioned meter and probe. Enclosure (2) is a map showing the approximate locations of the twenty readings.

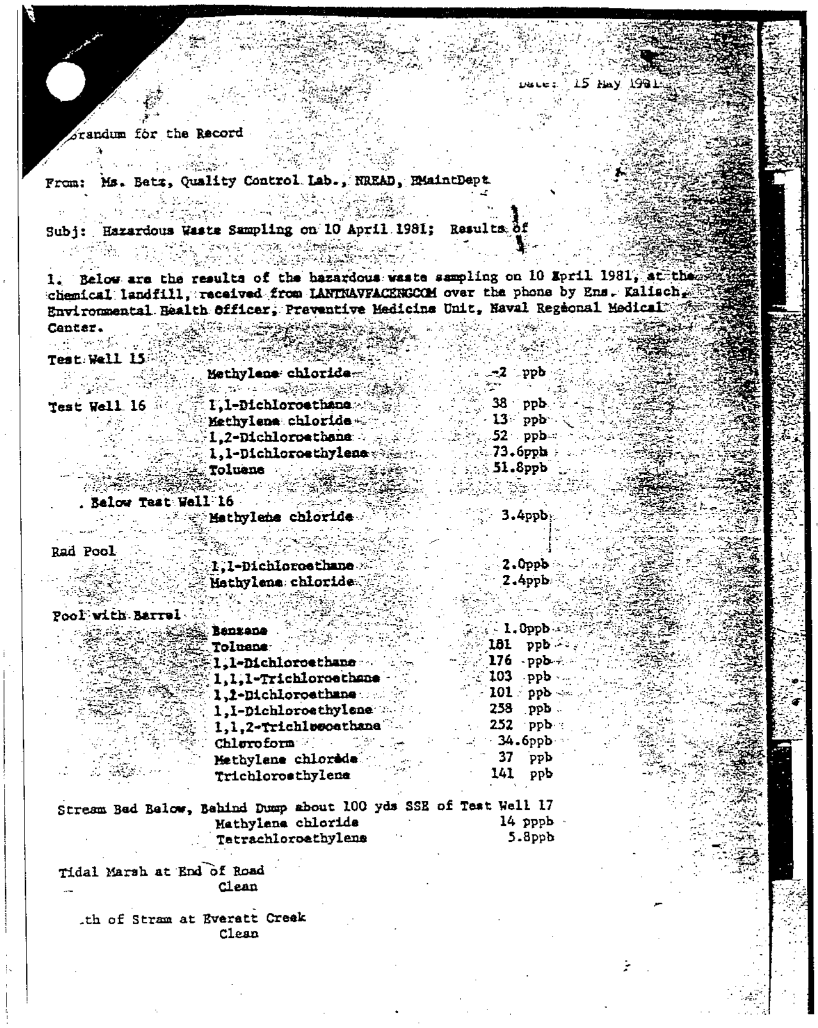
Elizabeth A. Betz
Elizabeth A. Betz
Supervisory Chemist

cc- Mr. Sharpe, Ecologist, N. R. E. A. Div.
Ens. Kalisch
Mr. R. J. Andrews

READINGS TAKEN AT TLZ OWL ON 3 MARCH 1981

Sample	Surface Reading	Depth of	Reading
#1	5800	10"	10000
#2	6000	10"	9500
#3	5500	10"	8500
#4	5500	10"	8500
#5		10"	9000
#6	5000	10"	8000
#7	6000	10"	9500
#8	4000	10"	5500
#9	6000	10"	9700
#10	5700	10"	8700
#11	5600	10"	9000
#12	5700	10"	9300
#13	5500	10"	9000
#14	5500	10"	8800
#15	5300	10"	8000
#16	4700	10"	6400
#17	5300	30"	9300
#18	4800	25"	7700
#19	6000	6"	8700
#20	5300	20"	8000

Enclosure (1)



Date: 15 May 1981

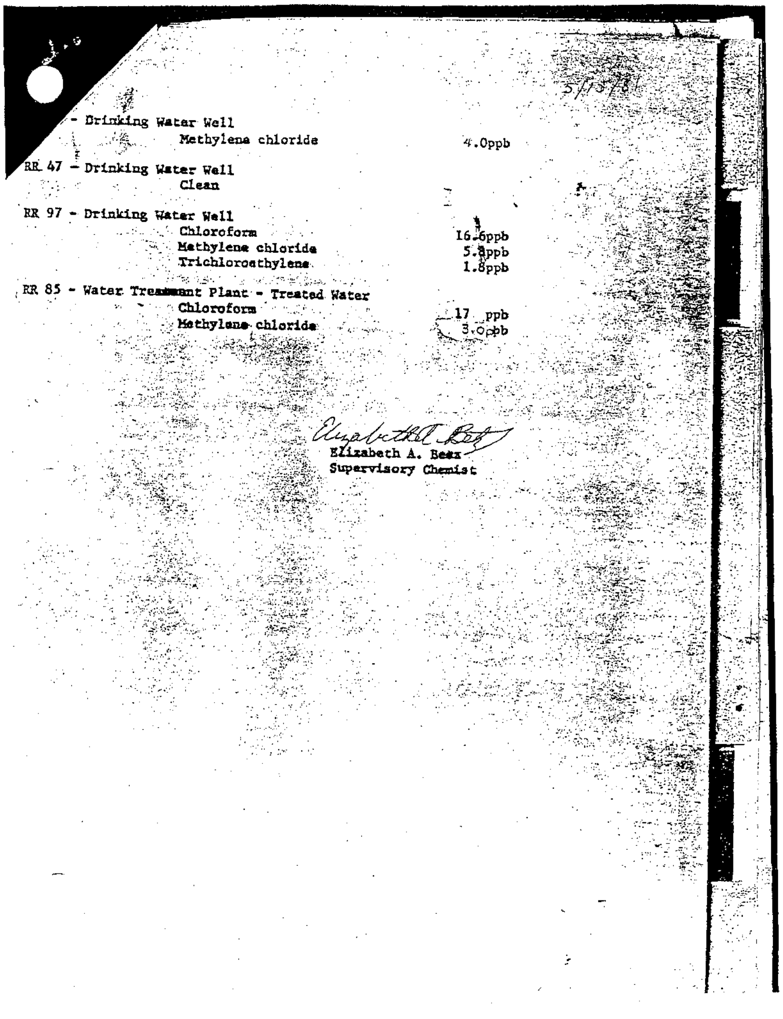
orandum for the Record

From: Ms. Betz, Quality Control Lab., NREAD, BMaintDept

Subj: Hazardous Waste Sampling on 10 April 1981; Results of

1. Below are the results of the hazardous waste sampling on 10 April 1981, at the chemical landfill, received from LANTNAVFACENGCOM over the phone by Ens. Kalisch, Environmental Health Officer, Preventive Medicine Unit, Naval Regional Medical Center.

Test Well 15		
	Methylene chloride	-2 ppb
Test Well 16	1,1-Dichloroethane	38 ppb
	Methylene chloride	13 ppb
	1,2-Dichloroethane	52 ppb
	1,1-Dichloroethylene	73.6ppb
	Toluene	51.8ppb
Below Test Well 16		
	Methylene chloride	3.4ppb
Red Pool		
	1,1-Dichloroethane	2.0ppb
	Methylene chloride	2.4ppb
Pool with Barrel		
	Benzene	1.0ppb
	Toluene	181 ppb
	1,1-Dichloroethane	176 ppb
	1,1,1-Trichloroethane	103 ppb
	1,2-Dichloroethane	101 ppb
	1,1-Dichloroethylene	238 ppb
	1,1,2-Trichloroethane	252 ppb
	Chloroform	34.6ppb
	Methylene chloride	37 ppb
	Trichloroethylene	141 ppb
Stream Bed Below, Behind Dump about 100 yds SSE of Test Well 17		
	Methylene chloride	14 pppb
	Tetrachloroethylene	5.8ppb
Tidal Marsh at End of Road		
	Clean	
th of Stram at Everett Creek		
	Clean	



5/15/81

- Drinking Water Well		
	Methylene chloride	4.0ppb
RR 47 - Drinking Water Well		
	Clean	
RR 97 - Drinking Water Well		
	Chloroform	16.6ppb
	Methylene chloride	5.8ppb
	Trichloroethylene	1.8ppb
RR 85 - Water Treatment Plant - Treated Water		
	Chloroform	17 ppb
	Methylene chloride	3.0ppb

Elizabeth A. Betz

Elizabeth A. Betz
Supervisory Chemist

- Summary by Camp Lejeune
Wallace Eakes

Page Referenced

Chemical Dump (RR)

np established in early to mid 50ies

- in Early DAYS MARINE units used the Dump for HAZ Materials

- Mr. Ed CASPER (1959-65) Had Admin control of Dump.

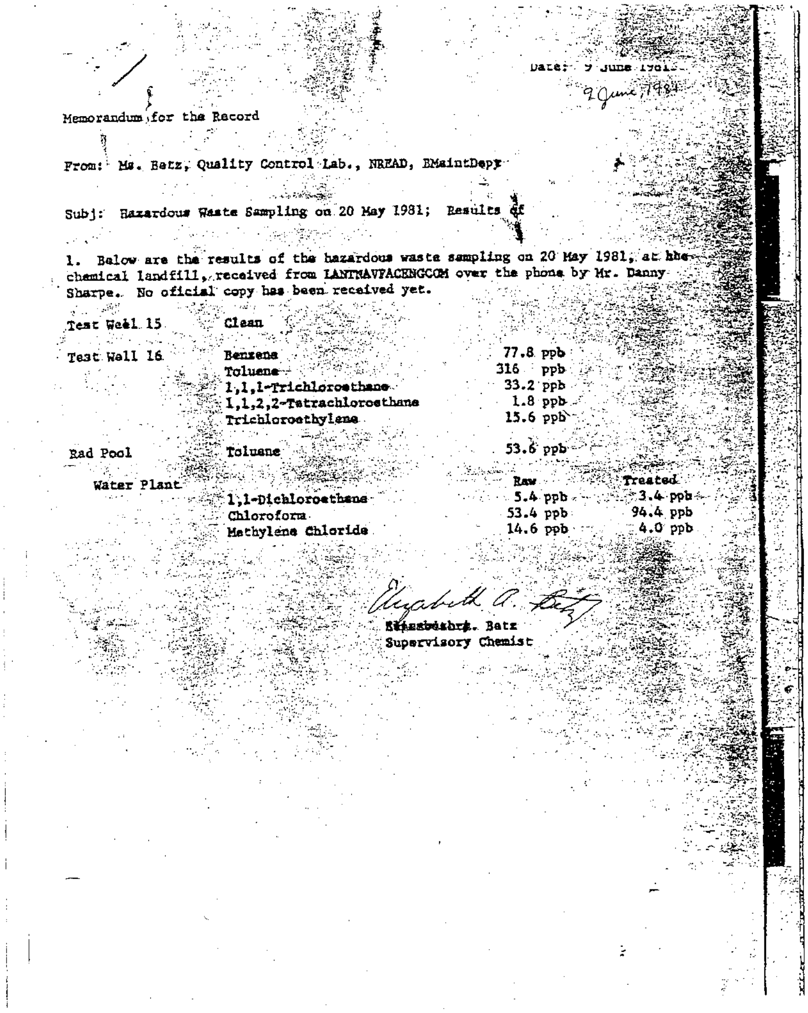
- In Early Days parallel Ditches were dug + used to dispose Materials

- MR. DAN TALLMAN had admin control of Dump 1965-75/6

- Dump closed ~ 76 (late 70ies)

- Materials Dumped
  - PCP - pentachlorophenol
  - DDT
  - TCE (many other PPP chemicals)
  - Canned food
  - Shoe impregnite (water Repellent)
  - VARSOL
  - gas cylinders
  - cylinders for filling Balloons
  - CANVAS (tents)
  - HTH
  - PCB (in (tanks)
  - malathion
  - Diazion
  - Lindane
  - Chemical test kits
  - Maybe agents

K.M.
Carl Millise
no chit of site [illegible]



Date: 9 June 1981

9 June, 1984

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., NREAD, EMaintDept

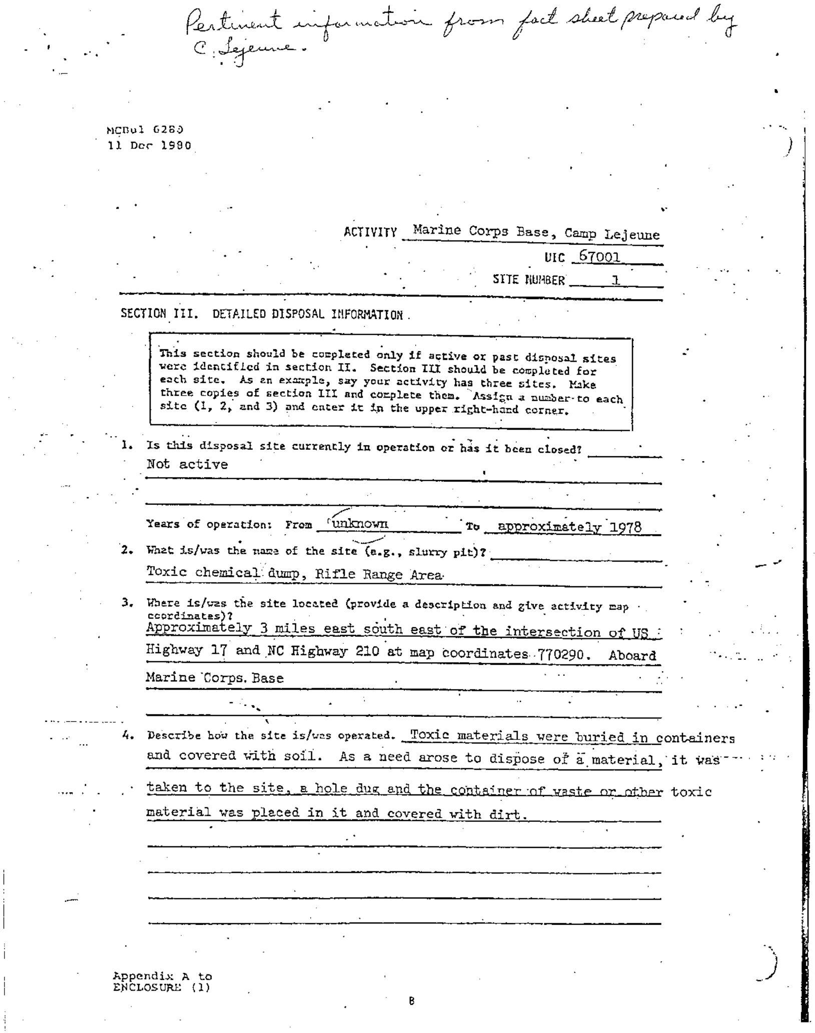
Subj: Hazardous Waste Sampling on 20 May 1981; Results of

1. Below are the results of the hazardous waste sampling on 20 May 1981, at the chemical landfill, received from LANTNAVFACENGCOM over the phone by Mr. Danny Sharpe. No oficial copy has been received yet.

Test Weel 15	Clean		
Test Well 16	Benzene	77.8 ppb	
	Toluene	316 ppb	
	1,1,1-Trichloroethane	33.2 ppb	
	1,1,2,2-Tetrachloroethane	1.8 ppb	
	Trichloroethylene	15.6 ppb	
Rad Pool	Toluene	53.6 ppb	
		Raw	Treated
Water Plant	1,1-Dichloroethane	5.4 ppb	3.4 ppb
	Chloroform	53.4 ppb	94.4 ppb
	Methylene Chloride	14.6 ppb	4.0 ppb

Elizabeth A. Betz

Elizabeth A. Betz
Supervisory Chemist



Pertinent information from fact sheet prepared by C. Lejeune.

MCBul 6280
11 Dec 1980

ACTIVITY Marine Corps Base, Camp Lejeune
UIC 67001
SITE NUMBER 1

SECTION III. DETAILED DISPOSAL INFORMATION.

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. Is this disposal site currently in operation or has it been closed? Not active

Years of operation: From unknown To approximately 1978

2. What is/was the name of the site (e.g., slurry pit)? Toxic chemical dump, Rifle Range Area

3. Where is/was the site located (provide a description and give activity map coordinates)? Approximately 3 miles east south east of the intersection of US Highway 17 and NC Highway 210 at map coordinates 770290. Aboard Marine Corps Base

4. Describe how the site is/was operated. Toxic materials were buried in containers and covered with soil. As a need arose to dispose of a material, it was taken to the site, a hole dug and the container of waste or other toxic material was placed in it and covered with dirt.

Appendix A to
ENCLOSURE (1)

B

ACTIVITY Marine Corps Base, Camp Lejeune
UIC 67001
SITE NUMBER 1

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

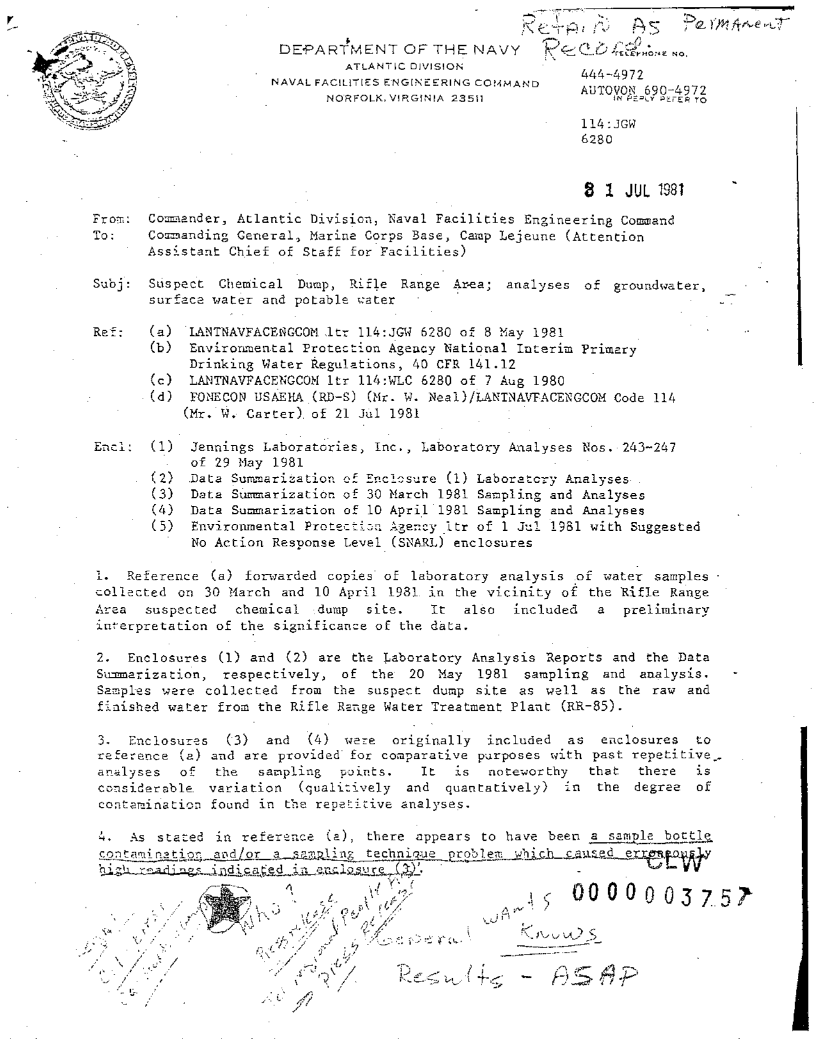
The site is located approximately 300 meters southwest of New River at an elevation of approximately 25 ft. above sea level. Based on soils maps developed by Soil Conservation Service, USDA, soils in the area have the following characteristics. The soil (baymeade) has a sandy surface layer approximately 2 ft thick. Below this, materials are sandy loams or loamy sands with high permeability. Depth to seasonal high water table is 3.5-5 ft. The soil has high corrosivity to concrete and low for steel.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

The site is surrounded by managed forests consisting of loblolly pine and various hardwood trees and shrubs. Much of the site is covered with pine saplings. There are no apparent effects of the site on surrounding vegetation.

9. Do personnel live or work near the site? Please explain. No

The site is in a relatively remote location and access is restricted to authorized personnel.



Retain As Permanent Record.

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

TELEPHONE NO.
444-4972
AUTOVON 690-4972
IN REPLY REFER TO
114:JGW
6280

31 JUL 1981

From: Commander, Atlantic Division, Naval Facilities Engineering Command
To: Commanding General, Marine Corps Base, Camp Lejeune (Attention Assistant Chief of Staff for Facilities)

Subj: Suspect Chemical Dump, Rifle Range Area; analyses of groundwater, surface water and potable water

Ref: (a) LANTNAVFACENGCOM ltr 114:JGW 6280 of 8 May 1981
(b) Environmental Protection Agency National Interim Primary Drinking Water Regulations, 40 CFR 141.12
(c) LANTNAVFACENGCOM ltr 114:WLC 6280 of 7 Aug 1980
(d) FONECON USAEHA (RD-S) (Mr. W. Neal)/LANTNAVFACENGCOM Code 114 (Mr. W. Carter) of 21 Jul 1981

Encl: (1) Jennings Laboratories, Inc., Laboratory Analyses Nos. 243-247 of 29 May 1981
(2) Data Summarization of Enclosure (1) Laboratory Analyses
(3) Data Summarization of 30 March 1981 Sampling and Analyses
(4) Data Summarization of 10 April 1981 Sampling and Analyses
(5) Environmental Protection Agency ltr of 1 Jul 1981 with Suggested No Action Response Level (SNARL) enclosures

1. Reference (a) forwarded copies of laboratory analysis of water samples collected on 30 March and 10 April 1981 in the vicinity of the Rifle Range Area suspected chemical dump site. It also included a preliminary interpretation of the significance of the data.

2. Enclosures (1) and (2) are the Laboratory Analysis Reports and the Data Summarization, respectively, of the 20 May 1981 sampling and analysis. Samples were collected from the suspect dump site as well as the raw and finished water from the Rifle Range Water Treatment Plant (RR-85).

3. Enclosures (3) and (4) were originally included as enclosures to reference (a) and are provided for comparative purposes with past repetitive analyses of the sampling points. It is noteworthy that there is considerable variation (qualitively and quantatively) in the degree of contamination found in the repetitive analyses.

4. As stated in reference (a), there appears to have been a sample bottle contamination and/or a sampling technique problem which caused erroneously high readings indicated in enclosure (3).

CLW
0000003757

Who ?

[illegible]

General wants
Knows
Results - ASAP

114:JGW
6280

5. Reference (a) noted that of all the trace organic contaminants found, only the total trihalomethanes (TTHM) have an established drinking water standard (reference (b)). The trihalomethanes are a family of one-carbon alkanes with three halogen atoms substituted for hydrogen atoms. The family consists of bromodichloromethane ($CHCl_2Br$) dibromochloromethane ($CHClBr_2$), chloroform ($CHCl_3$), and bromoform ($CHBr_3$). Of these, only chloroform was detected, although methylene chloride (a precursor of chloroform formed in the chlorine disinfection of water) was detected in the majority of samples.

6. Maximum contaminant levels (MCL) for total trihalomethanes apply only for water treatment plants applying a disinfectant in the treatment process, and serving a population of 10,000 or more individuals. Thus, technically, the TTHM limits are not effective standards at the Rifle Range Water Treatment Plant.

ie. < 10,000 users

7. Reference (c) documents the initiation of drinking water TTHM monitoring program which includes samples from the Hadnot Point and Air Station plants and distribution systems. Analyses for TTHM are performed by the U.S. Army Environmental Health Agency (RD-S) Laboratory, Fort McPherson. By reference (d), arrangements have been made to include the Rifle Range plant and system in the TTHM monitoring program. Sampling and analyses are to commence in July 1981.

8. Enclosure (5) is the latest EPA Suggested No Action Response Level (SNARL), for five organic contaminants in drinking water. As is emphasized in the preface of each SNARL, these are non-enforceable standards for contaminant levels which are calculated to result in no adverse response or either in low (typically 1 in 1,000,000 or 1 in 100,000) additional cancer risk. Only three of the four SNARLS are applicable to the contaminants found in enclosures (2), (3) and (4). The applicable SNARL guidelines are summarized as follows:

1,1,1-Trichloroethane	1 mg/l (ppm) chronic SNARL
Tetrachloroethylene	2.3 mg/l (ppm) one-day SNARL 175 ug/l (ppb) ten-day SNARL 20 ug/l (ppb) Long term SNARL 35 ug/l (ppb) 10^{-5} excess cancer risk 3.5 ug/l (ppb) 10^{-6} excess cancer risk Suggested guidance - no more than 40 ug/l (ppb)
Trichloroethylene	2 mg/l (ppm) one-day SNARL 200 ug/l (ppb) ten-day SNARL 75 ug/l (ppb) long-term SNARL 45 ug/l (ppb) 10^{-5} excess cancer risk 4.5 ug/l (ppb) 10^{-6} excess cancer risk

Page Referenced

114:JGW
6280

ing the initial sampling and analysis data due to suspect other error, LANTNAVFACENGCOM offers the following nclosures (2) and (4) data in light of the SNARL and TTHM

a. The 20 May 1981, RR-85 WTP finished water analysis indicates TTHM levels very close to the maximum contaminant level.

b. The 10 April 1981, RR-97 well water analysis indicates low level organic contamination. However, due to the lower levels of contamination found in the samples from RR-45 and RR-47 Wells, consideration should be given to operating these wells preferentially over the RR-97 Well.

c. Test well and surface water data from samples at or around the suspect dump site, especially at Test Well 16 and Sample Point No. 5, a stagnant pool of water at the dump site, indicate significant levels of contamination which will require additional investigation.

10. Notification has been received by LANTNAVFACENGCOM that MCB CAMP LEJEUNE is scheduled for FY-82 Initial Assessment Study (IAS) in the Navy Assessment and Control of Installation Pollutants (NACIP) Program. The IAS is the first phase in a program to identify, assess, and control the contamination of the environment from past hazardous waste disposal operations at Navy and Marine Corps activities. Information contained in this report and the TTHM monitoring program will be utilized in the IAS.

11. LANTNAVFACENGCOM recommends no further action on this matter at this time until the NACIP, IAS and TTHM monitoring programs begin to yield additional data for review. It is suggested that this information be passed along to State and local officials to appraise them of the potential problem, our analyses to date indicating no migration of pollutants into the Rifle Range Well System, and the future investigative and corrective actions that will be undertaken. (See Below)

12. Point of contact for this matter is Mr. Jerry Wallmeyer, telephone 444-4972, AUTOVON 690-4972 of this Command.

J. R. BAILEY
By direction

Copy to:
CMC (Code LFF 2)
NAVFACENGCOM (Code 112)
NAVENENVSA
NAVREGMEDCEN CAMP LEJEUNE (Occupational and Preventative Medicine)
MCB CAMP LEJEUNE (Natural Resources and Environmental Affairs)

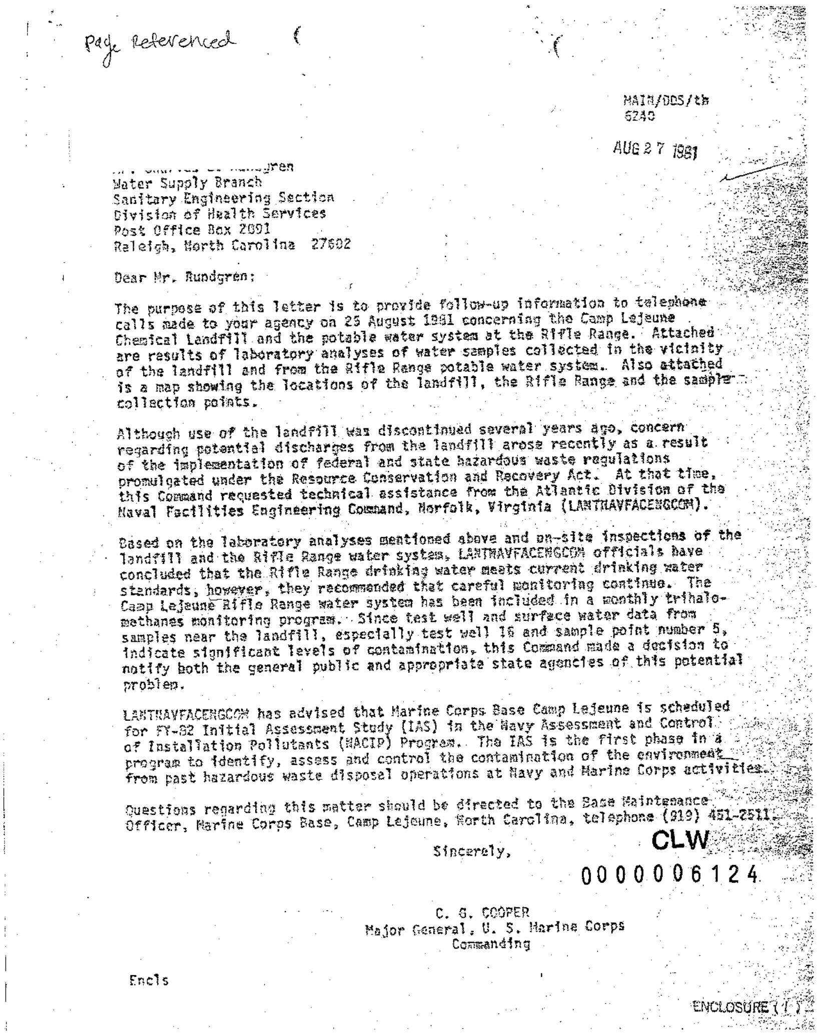
Supervisory Ecologist recommends a meeting be arranged with NC Dept. Health Services Regional Personnel, Base Legal, Base Maintenance Officer reps. (3 ie. Utilities Director, ~~Water~~ Quality control chemist, Supervisory Ecol/ Director NREAD) and ACS Facilities to review the enclosed. as opposed to a written notification.

10 AP'

MCB CAMP LEJEUNE
SAMPLE DATE 10 APRIL 1981
ALL RESULTS IN PARTS PER BILLION (ppb)

	TEST WELL NO. 15	TEST WELL NO. 16	POOL OF WATER BELOW WELL NO. 16	RAD POOL	RR-45 WELL	RR-47 WELL	RR-97 WELL	RR-85 WTP FINISHED WATER TAP	No. 5*	No. 6*	No. 7*	No. 8*
ZENE									1			
[illegible]		52							101			
ACHLORIDE												
- DICHLOROETHANE		52							176			
1 - TRICHLOROETHANE									103			
- DICHLOROETHANE		38		2					101			
- DICHLOROETHYLENE		74							258			
2 - TRICHLOROETHANE									252			
ROFORM							17	17	35			
YLENE CHLORIDE	2	13	3	2	4		6	3	37	14		
ACHLOROETHYLENE										6		
HLOROETHYLENE							②		141			
TOTAL	~~2~~	~~229~~	3	4	4		25	20	1,205	20		

5 Pool of Water with old barrel in it at old chemical dump
Stream bed below and behind old chemical dump, about 100 yds SSE of Test Well No. 17.
7 Tidal Marsh at end of road past old chemical dump
8 New river, between mouth of stream and Everett Creek, right fork of road through TLZ owl to river



Page Referenced

MAIN/DDS/th
6240

AUG 2 7 1981

[illegible]gren
Water Supply Branch
Sanitary Engineering Section
Division of Health Services
Post Office Box 2091
Raleigh, North Carolina 27602

Dear Mr. Rundgren:

The purpose of this letter is to provide follow-up information to telephone calls made to your agency on 25 August 1981 concerning the Camp Lejeune Chemical Landfill and the potable water system at the Rifle Range. Attached are results of laboratory analyses of water samples collected in the vicinity of the landfill and from the Rifle Range potable water system. Also attached is a map showing the locations of the landfill, the Rifle Range and the sample collection points.

Although use of the landfill was discontinued several years ago, concern regarding potential discharges from the landfill arose recently as a result of the implementation of federal and state hazardous waste regulations promulgated under the Resource Conservation and Recovery Act. At that time, this Command requested technical assistance from the Atlantic Division of the Naval Facilities Engineering Command, Norfolk, Virginia (LANTNAVFACENGCOM).

Based on the laboratory analyses mentioned above and on-site inspections of the landfill and the Rifle Range water system, LANTNAVFACENGCOM officials have concluded that the Rifle Range drinking water meets current drinking water standards, however, they recommended that careful monitoring continue. The Camp Lejeune Rifle Range water system has been included in a monthly trihalomethanes monitoring program. Since test well and surface water data from samples near the landfill, especially test well 16 and sample point number 5, indicate significant levels of contamination, this Command made a decision to notify both the general public and appropriate state agencies of this potential problem.

LANTNAVFACENGCOM has advised that Marine Corps Base Camp Lejeune is scheduled for FY-82 Initial Assessment Study (IAS) in the Navy Assessment and Control of Installation Pollutants (NACIP) Program. The IAS is the first phase in a program to identify, assess and control the contamination of the environment from past hazardous waste disposal operations at Navy and Marine Corps activities.

Questions regarding this matter should be directed to the Base Maintenance Officer, Marine Corps Base, Camp Lejeune, North Carolina, telephone (919) 451-2511.

Sincerely,

C. G. COOPER
Major General, U. S. Marine Corps
Commanding

Encls

ENCLOSURE (1)

MCB CAMP LEJEUNE
SAMPLE DATE 10 APRIL 1981
ALL RESULTS IN PARTS PER BILLION (ppb)

	RR-45 WELL	RR-47 WELL	RR-97 WELL	RR-85 WTP FINISHED WATER TAP	SAMPLE POINT NO. 7*	SAMPLE POINT No. 8*
BENZENE						
TOLUENE						
ARBON TETRACHLORIDE						
, 2 - DICHLOROETHANE						
1, 1, 1 - TRICHLOROETHANE						
1, 1 - DICHLOROETHANE						
1, 1 - DICHLOROETHYLENE						
1, 1, 2 - TRICHLOROETHANE						
CHLOROFORM			17	17		
ETHYLENE CHLORIDE	4		6	3		
TRACHLOROETHYLENE						
TRICHLOROETHYLENE			2			

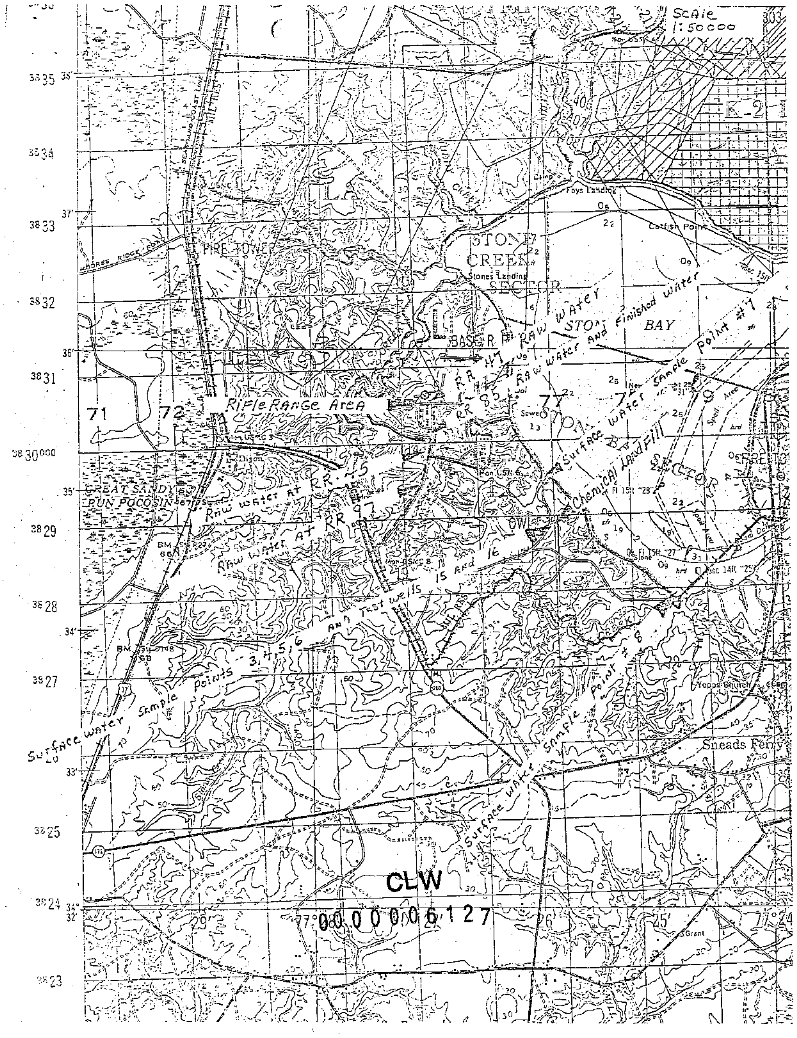
The above chart summarizes data from analysis run on water samples collected at locations indicated on Map shown on page 4. Pages 5 and 6 outline the parameters tested for and detection limits. Analysis sheets similar to those on pages 5 and 6 are available for each sampling point. Analyses were conducted by Jennings Laboratory, Inc., 1118 Cypress Avenue, P. O. Box 854, Virginia Beach, Virginia 23451, phone (804) 425-1498.

MCB CAMP LEJEUNE
SAMPLE DATE 10 APRIL 1981

ALL RESULTS IN PARTS PER BILLION (ppb)

	TEST WELL NO. 15	TEST WELL NO. 16	Sample Point No.3 Pool of Water Below Well No. 16	Sample Point No. 4 RAD POOL	SAMPLE POINT NO. 5*	SAMPLE POINT NO. 6*
BENZENE					1	
TOLUENE		52			101	
CARBON TETRACHLORIDE						
1, 2 - DICHLOROETHANE		52			176	
1, 1, 1 - TRICHLOROETHANE					103	
1, 1 - DICHLOROETHANE		38		2	101	
1, 1 - DICHLOROETHYLENE		74			258	
1, 1, 2 - TRICHLOROETHANE					252	
CHLOROFORM					35	
METHYLENE CHLORIDE	2	13	3	2	37	14
TETRACHLOROETHYLENE						6
TRICHLOROETHYLENE					141	

The above chart summarizes data from analysis run on water samples collected at locations indicated on map shown on page 4. Pages 5 and 6 outline the parameters tested for and detection limits. Analysis sheets similar to those on pages 5 and 6 are available for each sampling point. Analyses were conducted by Jennings Laboratory, Inc., 1118 Cypress Avenue, P. O. Box 854, Virginia Beach, Virginia 23451, phone (804) 425-1498.


Scale 1:50000
K-2
Foys Landing
Catfish Point
STONE CREEK SECTOR
Stones Landing
FIRE TOWER
MOORES RIDGE ROAD
BASE R
RR 47 Raw water
RR 85 Raw water and Finished water
STONE BAY
Surface water Sample point #1
Rifle Range Area
71
72
77
Raw water at RR 45
Raw water at RR 97
GREAT SANDY RUN POCOSIN
Chemical LandFill
Surface water
SECTOR
15 and 16
Surface water Sample points 3, 4, 5, 6 and Test wells
Surface water Sample point # 8
Sneads Ferry
Verona Church
Dixon
Grant
29'
77°
26'
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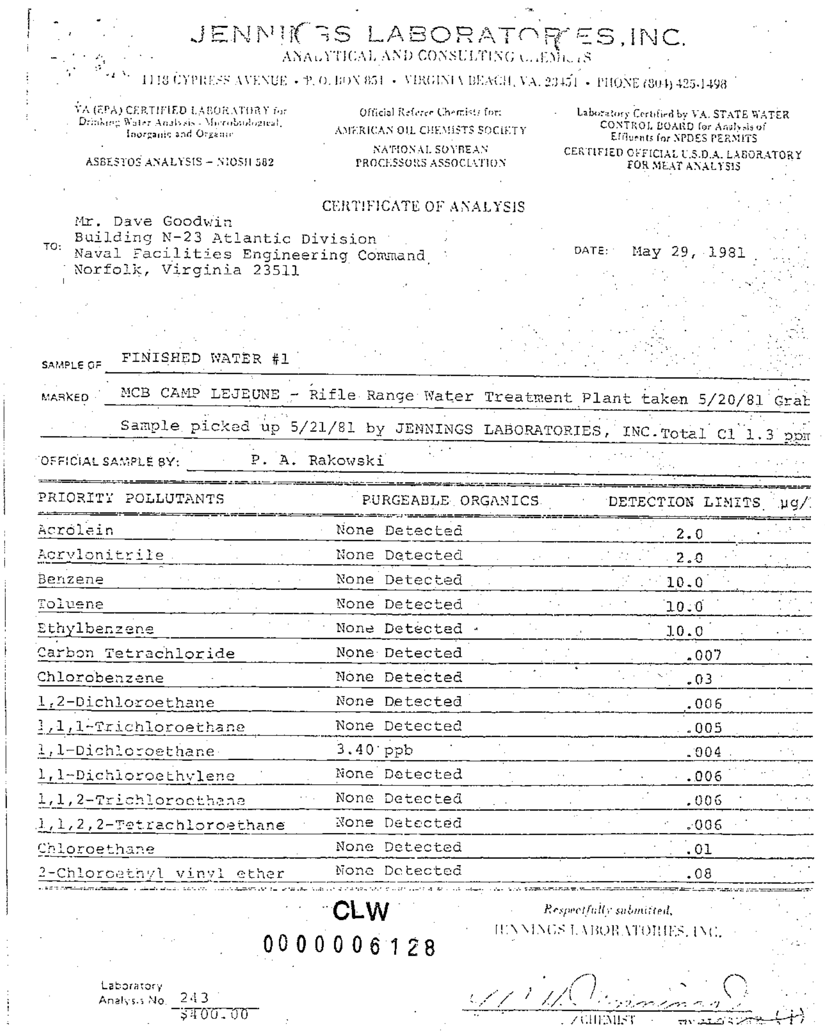

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VA (EPA) CERTIFIED LABORATORY for Drinking Water Analysis - Microbiological, Inorganic and Organic

ASBESTOS ANALYSIS – NIOSH 582

Official Referee Chemists for:
AMERICAN OIL CHEMISTS SOCIETY
NATIONAL SOYBEAN PROCESSORS ASSOCIATION

Laboratory Certified by VA. STATE WATER CONTROL BOARD for Analysis of Effluents for NPDES PERMITS

CERTIFIED OFFICIAL U.S.D.A. LABORATORY FOR MEAT ANALYSIS

CERTIFICATE OF ANALYSIS

TO:
Mr. Dave Goodwin
Building N-23 Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 23511

DATE: May 29, 1981

SAMPLE OF FINISHED WATER #1

MARKED MCB CAMP LEJEUNE – Rifle Range Water Treatment Plant taken 5/20/81 Grab Sample picked up 5/21/81 by JENNINGS LABORATORIES, INC. Total Cl 1.3 ppm

OFFICIAL SAMPLE BY: P. A. Rakowski

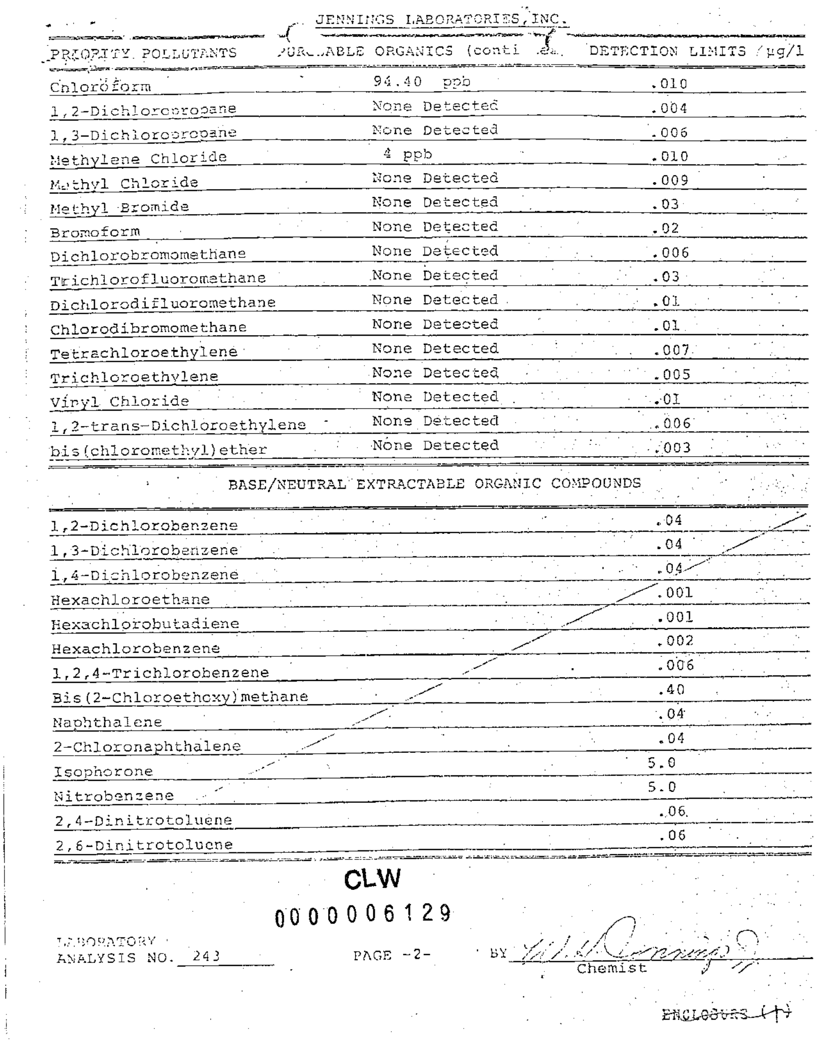
PRIORITY POLLUTANTS	PURGEABLE ORGANICS	DETECTION LIMITS μg/
Acrolein	None Detected	2.0
Acrylonitrile	None Detected	2.0
Benzene	None Detected	10.0
Toluene	None Detected	10.0
Ethylbenzene	None Detected	10.0
Carbon Tetrachloride	None Detected	.007
Chlorobenzene	None Detected	.03
1,2-Dichloroethane	None Detected	.006
1,1,1-Trichloroethane	None Detected	.005
1,1-Dichloroethane	3.40 ppb	.004
1,1-Dichloroethylene	None Detected	.006
1,1,2-Trichloroethane	None Detected	.006
1,1,2,2-Tetrachloroethane	None Detected	.006
Chloroethane	None Detected	.01
2-Chloroethyl vinyl ether	None Detected	.08

CLW
0000006128

Respectfully submitted,
JENNINGS LABORATORIES, INC.

CHEMIST

Laboratory Analysis No. 243
$400.00



JENNINGS LABORATORIES, INC.

PRIORITY POLLUTANTS	PURGEABLE ORGANICS (continued)	DETECTION LIMITS µg/1
Chloroform	94.40 ppb	.010
1,2-Dichloropropane	None Detected	.004
1,3-Dichloropropane	None Detected	.006
Methylene Chloride	4 ppb	.010
Methyl Chloride	None Detected	.009
Methyl Bromide	None Detected	.03
Bromoform	None Detected	.02
Dichlorobromomethane	None Detected	.006
Trichlorofluoromethane	None Detected	.03
Dichlorodifluoromethane	None Detected	.01
Chlorodibromomethane	None Detected	.01
Tetrachloroethylene	None Detected	.007
Trichloroethylene	None Detected	.005
Vinyl Chloride	None Detected	.01
1,2-trans-Dichloroethylene	None Detected	.006
bis(chloromethyl)ether	None Detected	.003

BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS

1,2-Dichlorobenzene		.04
1,3-Dichlorobenzene		.04
1,4-Dichlorobenzene		.04
Hexachloroethane		.001
Hexachlorobutadiene		.001
Hexachlorobenzene		.002
1,2,4-Trichlorobenzene		.006
Bis(2-Chloroethoxy)methane		.40
Naphthalene		.04
2-Chloronaphthalene		.04
Isophorone		5.0
Nitrobenzene		5.0
2,4-Dinitrotoluene		.06
2,6-Dinitrotoluene		.06

LABORATORY
ANALYSIS NO. 243   PAGE -2-   BY ____________
Chemist

~~ENCLOSURE (1)~~

1. Facility: Marine Corps Base
Address: Camp Lejeune, North Carolina
County: Onslow

2. Specific Type of Pollution: Miscellaneous types of hazardous materials/wastes.

3. Amount of Pollution: Undetermined at this time.

4. Pollution Source and Discharge, Emission or Deposit Site:

Leacheate from inactive chemical landfill located approximately 1800 meters north west of the confluence of Everetts Creek and New River and 300 meters west of New River shoreline.

5. Existing Treatment and Other Control Measures:

Three existing monitoring wells located at the site are periodically sampled and analysis performed. No remedial/abatement facilities/actions are in place or programmed.

6. Effectiveness of Existing Treatment and Control:

Adequacy of monitoring wells cannot be documented. Hydrological conditions at the site and hydrological relationships between the site and surrounding potable water wells/supplies are unknown.

7. Remedial Measures Proposed and Estimated Effect on Correcting Problem:

Provide the following: (a) Hydrological/engineering evaluation of the site; potentially affected ground/surface water supplies; and adequacy of existing monitoring program. (b) Design and construction of additional monitoring facilities/wells if required. (c) Develop baseline data for groundwater quality at the problem site.

8. Applicable Standards:

a. Comprehensive Environmental Response, Compensation and Liability Act of 1980.

b. Resource Conservational Recovery Act Regulations.

9. Project Schedule:

To be determined.

10. North Carolina Public Health Agency has been advised of the potential problem and supplied with available monitoring data. The general public was advised by a news release. The site was identified to the EPA as required by the Comprehensive Environmental Response Compensation and Liability Act of 1980.

ENCLOSURE (2)

MAR 24 1982

NAV 5216/144 (REV. 6-70)
/N 0107-LF-778-8099
DEPARTMENT OF THE NAVY

Memorandum

DATE: 12 February 1982

FROM: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

TO: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

SUBJ: Summary of Trihalomethane Monitoring

REF: (a) 10NCAC 10D .1635; Total Trihalomethanes Sampling and Analysis

1. Reference (a) is the section of the North Carolina Administrative Code that addresses trihalomethane monitoring. It is congruent with Public Law 93-523, Safe Drinking Water Act (SDWA); Title 40, Code of Federal Regulations, Part 141, "National Interim Primary Drinking Water Regulations"; NAVFAC Instruction 11330.14A, Safe Drinking Water at Navy Shore Activities and Marine Corps Order 6280.3, Safe Drinking Water.

2. Reference(a) states that community water systems serving populationof 10,000 or more people and add a disinfectant to the waer during the treatment process shall analyze for total trihalomethanes (TTHM). For systems serving 75,00 or more monitoring shall begin not later than 29 November 1980. For systems serving 10,000-74,999 monitoring shall begin not later than 29 November 1982.

3. Reference (a) states that analyses shall be performed quarterly and that at least four samples for each plant shall be collected, all in the same 24 hr. period. 25% of the samples shall be taken at locationsreflecting the longest time of the water in the system. 75% of the samples shall be taken at locations proportional to the population served. The results of all analyses per quarter shall be arithmetically averaged and reported to the State within 30 days of the system's receipt of such results. All samples collected shall be used in the computation of the average.

4. Compliance, according to Reference (a), shall be determined based on a running annual average of quarterly samples collected by the system. If the average of samples covering any 12 month period exceeds the maximum contaminant level, the supplier of water shall report to the Saate and notify the public. Before any system makes any significant modifications to the treatment process to achieve compliance, the system must submit and obtain state approval if the plan for modification and the safeguards used to ensure the bacteriological quality of the water.

5. The maximum contaminant level for TTHM of 0.10 mg/l took effect 29 November 1981 for systems serving 75,000 or more. The maximum contaminant level shall take effect 29 November 1983 for systems serving 10,000-74,999.

6. The trihalomethane surveillance was arranged by LANTDIV in September 1980. Wallace Carter of LANTDIV stated that only the Hadnot Point and Air Station systems required monitoring, they were the only systems serving 10,000 or more aboard Camp Lejeune. Sampling was initiated by the Quality Control Lab, of the Hadnot Point and the Air Station systems in October 1980. Analysis of the samples had been arranged by LANTDIV to be run by the US Army Environmental Hygiene Agency in their laboratory at Fort McPherson, Ga. The Feredal Registar calls for sampling every three months, however

page Referenced

us that the arrangement with the Army was for monthly sampling.
ember, so there was no November samples. Due to delays in mail-
McPherson sample containers were not received in time to collect samples
for March or May 1981.

7. Do to the location of the Chemical Dump and the results of analyses in the area of the Dump, in July 1981, Jerry Wallmeyer of LANTDIV arranged with the Army to increase the trihalomethane surveillance to include the Rifle Range Water System. Jerry Wallmeyer stated that surveillance had been arranged to continue through December 1981. At this time, it was learned that LANTDIV had been receiving the results and were holding them until all had come in. We then requested that the results be sent right away. In the cover letter received from LANTDIV, with the results, LANTDIV stated that no action should be taken on Camp Lejeune's part until LANTDIV made their recommendations in December 1981.

8. The Army's lab experience equipment problems that resulted ~~them~~ in a large back log of samples. They stopped sending sample containers for Hadnot Point and The Air Station after September 1981. They continued to sent containers for the Rifle Range, at our request, however they skipped November 1981.

9. On the sampling instruction sheet received with each batch of sample containers, The Army surveillance program called for a sample to be taken at the start of the distribution system, which means five samples were to be collected from each system. Also on the sheet, the point of contact listed for any questions is Mr. Willy,Neal, Chief Chemist, US Army Environmenatl Hygiene Agency, Regional Division-South, Fort McPherson, Ga (Autovon 588-3234, Commercial 404-752-3234.

Elizabeth A. Betz
Supervisory Chemist

GRAINGER LABORATORIES, INC.
LETTER OF AUGUST 10, 1982

ALSO ATTACHED ARE

MEMORANDUM FOR THE RECORDS WRITTEN BY SUPERVISORY CHEMIST
DATED MAY 25, 1982 AND JULY 30, 1982

MEMORANDUM WRITTEN BY SUPVY CHEMIST TO SUPVY ECOLOGIST
DATED AUGUST 19, 1982

GRAINGER LABORATORIES
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Process Development
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Methods Development
Special Investigations
Pesticides
RCRA

August 10, 1982
82-4471

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Discussion:

Previously all samples from site TT and HP presented difficulties in performing the monthly Trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejuene personnel.

Results:

The identity of the contaminant in the well field represented by samples 206 and 207 was suspected to be Tetrachloroethylene. This was confirmed by two analytical techniques and the results were 76 μg/l and 82 μg/l for samples 206 and 207 respectively.. Sample 86 from May 27, 1982 was reanalyzed as a part of our study. Sample 86 was from site TT and contained 80 μg/l tetrachloroethylene.

Samples 208 and 209 were also analyzed by the same analytical techniques. The magnitude of the contamination was not as great as previously observed from this same sampling point. Upon reanalyzing sample 120 from site HP May 27, 1982 , Trichloroethylene was identified and quantitated at 1400 μg/l. A lesser amount of Tetrachloroethylene was confirmed at 15 μg/l. Samples 208 and 209 contained 19 μg/l and 21 μg/l Trichloroethylene respectively; Tetrachloroethylene was not detected.

Camp Lejuene
GLI 82-4471
August 10, 1982
Page 2

Prior to this report, the samples from July 28, 1982 from site HP were analyzed. Traces of both solvents were found in this set. Though not quantitated, the level of Trichloroethylene seems to be in the range of that which was found in samples 208 and 209. The sample which showed the most contamination relative to the others was 205. Also sample 168 from site TT on July 28, 1982 was analyzed and shown to contain 104 µg/l Tetrachloroethylene.

Conclusion:

Tetrachloroethylene was identified as the contaminant in the well field coded "TT". Its concentration seems relatively stable over the period in which it has been examined. It was confirmed that the well field coded "HP" has shown contamination by Trichloroethylene and Tetrachloroethylene. These levels have been variable over the per studied and are now at significantly lower levels than when first encountered. The following table summarizes the findings:

Sample	Date Taken	Site Code	Tri chloroethylene	Tetra-chloroethylene
206	7-27-82	TT	-	76
207	7-27-82	TT	-	82
86	5-27-82	TT	-	80
168	7-28-82	TT	-	104
208	7-27-82	HP	19	<1
209	7-27-82	HP	21	<1
120	5-27-82	HP	1400	15
205	7-28-82	HP	No Data	1.0

Bruce A. Babson

Bruce A. Babson
Chemist

BAB/ab
Customer #92400

Date: 25 May 1982

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

Subj: Phone Conversation with Mike Hargett on 6 May 1982

1. On 6 May 1982, Mike Hargett, of Grainger Labs called to say that during the analysis of April's 1982 samples they had some interferences. He said that peaks for Perclene and Trichloroethylene (TCE), which are synthetic organic cleaning solvents were found in samples #001-005 (Tarawa Terrace Water System) and #037-041 (Hadnot Point Water System). He also stated that the TCE peak for the Hadnot Point samples overlapped the Bromodichloromethane peak. He asked if a less than value would be accepteable since that is all that could be read. I stated that that would be fine. He also stated that no mention would be made of the extra peaks except for the less than value on the repprt.

2. Right after I talked with Mike Hargett, I notified Danny Sharpe, Supervisory Ecologist, of Grainger's findings. The findings were then sent up the chain of command to Billy Elston, Deputy Base Maintenaance Officer, and over to the Utilities Director, Fred Cone.

3. Later on 6 May 1982, I called Mike Hargett back to discuss cost of analysis. Analysis would cost $75 for both parameters per sample.

4. On 14 May 1982, while briefing Col Millice and LtCol Fritzgerald on April's trihalomethane analysis, it appeared to me that they had not been informed about the findings. I didn't inform them.

Elizabeth A. Betz
Supervisory Chemist

Page Referenced

Date: 30 July 1982

Record

ility Control Lab., Environmental Section, NREAB, BMaintDiv

Raw and Treated Sampling at Tarawa Terrace and Hadnot Point Water Treatment Plants

1. On 28 July 1982, Gaines Huneycutt and Elizabeth Betz collected a raw and a treated water sample at the Water Treatment Plants for Hadnot Point and Tarawa Terrace. The reason for the sampling was that during the analysis of the Base's THM samples by Grainger Labs, Grainger had come accross some interferring peaks cause by the presence of trichloroethylene and perclene(synthetic organic cleaning solvents) in the samples from Tarawa Terrace and Hadnot Point.

2. Below is listed the sample numbers and locations of the samples.

Sample #	Location	Time
206 A&B	TT WTP, Bldg STT-38, Raw	1000
207 A&B	TT WTP, Bldg STT-39A, Treated	1005
208 A&B	HP WTP, Bldg 20(Man-hole)Raw	1055
209 A&B	HP WTP, Bldg 20, Treated	1100

3. The sample containers had arrived in an ice chest from Grainger. Mike Hargett had instructed that the samples had to be sent back to Grainger by bus and on ice since the solvents were highly volatile. A DD1348/1 was prepared by Mr. Richardson of Base Maintenance Property Office. At approximately 1130, the samples were carried to Freight Traffic, who had arranged to take them to the bus station for the 1400 bus to Raleigh. Mike Hargett was called and notified to have someone pick up the samples at approximately 1730 at the Raleigh bus station.

4. During a phone conversation with Mike Hargett on 30 July 1982, it was learned that the samples had been received.

Elizabeth A. Betz
Elizabeth A. Betz
Supervisory Chemist

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

1. On 6 May 1982, Mike Hargett, of Grainger Labs, called and informed me that on 3 May 1982, while they were analyzing the first set of Trihalomethane samples received from us, interferences possibly from chlorinated hydrocarbons hindered analysis of samples from two systems, Tarawa Terrace and Hadnot Point.

2. It was determined that raw and treated samples from the treatment plants for the two systems would be taken for analysis of the interferring chlorinated hydrocarbons. On 28 July 1982, a raw water sample, #206, and a treated water sample, #207, were taken at the Tarawa Terrace water treatment plant. A raw water sample, #208, and a treated water sample, #209, were taken at the Hadnot Point water treatment plant, on 28 July 1982. The Trihalomethane samples for July were also taken on 28 July 1982, for these two systems. In Grainger's letter, of 10 August 1982, they erroneous report the samplessas taken on 27 July 1982, they were collected and shipped on 28 July 1982.

3. Analysis of the above samples and some Grainger had preserved showed that in the Tarawa Terrace water treatment plant and system, the interferring chlorinated hydrocarbon is tetrachloroethylene, or otherwise known as perchloroethylene. Tetrachloroethylene is used as a dry cleaning and degreasing solvent, and heat-transfer medium, Analysis of the Hadnot Point water treatment plant and system samples showed Trichloroethylene and low levels of tetrachloroethylene. Trichloroethylene is used primarily as a metal degreaser. It is also used as a dry-cleaning solvent and a type of pesticide, fumigant.

4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

5. Tetrachloroethylene, in high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for tetrachloroethylene are 2300 ug/l for 1-day, 175 ug/l for 10-days, and 20 ug/l for longer-term where drinking water is the only source of exposure. On 9 April 1980, EPA came out with a Suggested Action Guidance on Tetrachloroethylene. This guidance was a result of possible tetrachloroethylene contamination of drinking water

where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/l (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/l (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/l.

6. Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethands), at high levels , has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for trichloroethylene were determined to be 2 mg/l for 1-day, 0.2 mg/l for 10-day, and 75 ug/l for a chronic snarl. There is no Suggested Action Guidance on trichloroethylene.

7. Below is a table of the results received from Grainger labs.

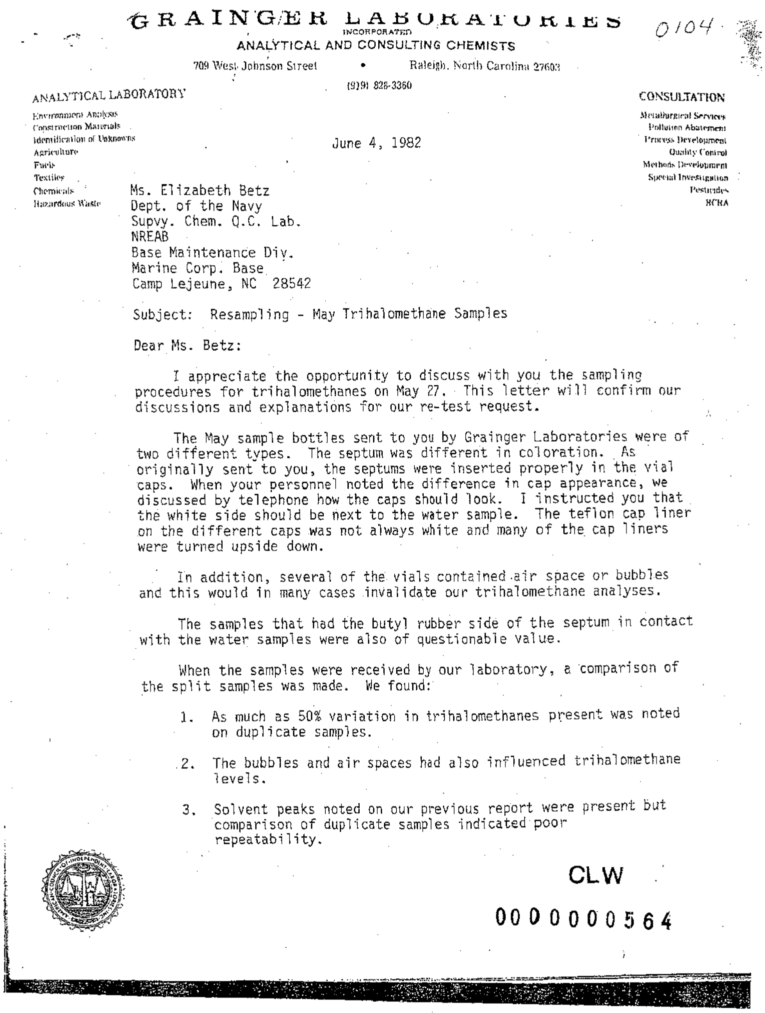
Sample #	Sample Date	WTP	Sample Site	_chloroethylene, ug/l Tri-	 Tetra-
86 168	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data	100
208	7-28-82	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

8. The level of tetrachloroethylene for the Tarawa Terrace system samples averaged 0.09 mg/l, which exceeded the recommended level of 0.04 mg/l. The levels do not vary significantly between the raw and treated samples. The raw and treated samples were taken at the plant where the water had already traveled some distance in pipes. Therefore, with no significant difference between raw and treated samples and the high average of 0.09 mg/l, I would believe the tetrachloroethylene contamination is possibly do to the use of coated A/C pipe in the raw water lines at Tarawa Terrace.. Tetrachloroethylene, in the Hadnot Point system samples is at trace levels and well under recommended levels.

9. The level of trichloroethylene, at Hadnot Point, is presently averaging 20 ug/l, which is below all three recommended snarls; 1-day, 10-day, and chronic. No explaination is offered for the 1400 ug/l level on 27 May 1982, or why it is now averaging only 20 ug/l.

Elizabeth A. Betz
Supervisory Chemist



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0104

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June 4, 1982

Ms. Elizabeth Betz
Dept. of the Navy
Supvy. Chem. Q.C. Lab.
NREAB
Base Maintenance Div.
Marine Corp. Base
Camp Lejeune, NC 28542

Subject: Resampling - May Trihalomethane Samples

Dear Ms. Betz:

I appreciate the opportunity to discuss with you the sampling procedures for trihalomethanes on May 27. This letter will confirm our discussions and explanations for our re-test request.

The May sample bottles sent to you by Grainger Laboratories were of two different types. The septum was different in coloration. As originally sent to you, the septums were inserted properly in the vial caps. When your personnel noted the difference in cap appearance, we discussed by telephone how the caps should look. I instructed you that the white side should be next to the water sample. The teflon cap liner on the different caps was not always white and many of the cap liners were turned upside down.

In addition, several of the vials contained air space or bubbles and this would in many cases invalidate our trihalomethane analyses.

The samples that had the butyl rubber side of the septum in contact with the water samples were also of questionable value.

When the samples were received by our laboratory, a comparison of the split samples was made. We found:

1. As much as 50% variation in trihalomethanes present was noted on duplicate samples.
2. The bubbles and air spaces had also influenced trihalomethane levels.
3. Solvent peaks noted on our previous report were present but comparison of duplicate samples indicated poor repeatability.

s. Elizabeth Betz
June 4, 1982
Page 2

In summary, the samples submitted have a poor reproducibility and reliability for analytical reporting purposes.

For these reasons, we strongly suggest your systems be resampled for the month of May. There will be no charge for the analytical work performed on the first set of May samples submitted to our laboratory. There also will be no charge for first set of sample bottles.

Please use the sampling procedure that I demonstrated to you and your personnel and I believe you will not capture bubbles in the sample vials. Also, the teflon side of the septum will be the hard side and the thinnest of the layers in the septum.

We appreciate your assistance and support in correcting this problem.

Very truly yours,

Michael C. Hargett
Vice President of Marketing

MCH:sb

0118

Date: 30 July 1982

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

Subj: Trihalomethane Sampling for July 1982

1. Sampling was initiated on 28 july 1982 by Gaines Huneycutt and Elizabeth Betz. Tarawa Terrace and Hadnot Point systems were collected. In addition to trihalomethane samples two extra samples, pertaining to the results of April's samples discussed by Elizabeth Betz and Mike Hargett on 6 May 1982, were taken at Tarawa Terrace and Hadnot Point Water Treatment Plants. These four extra samples, a raw and treated, were covered under a separate contract, purchase order 82-M-8238.

2. The extra samples, with a DD1348/1, packed in ice, were delivered to Freight Traffic at approximately 1130. Freight Traffic had arragged to bus the samples to Raliegh on the 1400 bus. Grainger Labs picked up the samples at the Raliegh Bus Station on 28 July 1982, around 1730.

3. Trihalomethane sampling was completed on 29 July 1982 by Gaines Huneycutt and Bob Lachapelle. Onslow Beach, Courthouse Bay, Rifle Range, New River, and Montford Point were collected.

4. The trihalomethane samples were repacked and mailed on 30 July 1982.

Elizabeth A. Betz
Supervisory Chemist

0121

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August 10, 1982
82-4471

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Discussion:

Previously all samples from site TT and HP presented difficulties in performing the monthly Trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejuene personnel.

Results:

The identity of the contaminant in the well field represented by samples 206 and 207 was suspected to be Tetrachloroethylene. This was confirmed by two analytical techniques and the results were 76 µg/l and 82 µg/l for samples 206 and 207 respectively.. Sample 86 from May 27, 1982 was reanalyzed as a part of our study. Sample 86 was from site TT and contained 80 µg/l tetrachloroethylene.

Samples 208 and 209 were also analyzed by the same analytical techniques. The magnitude of the contamination was not as great as previously observed from this same sampling point. Upon reanalyzing sample 120 from site HP May 27, 1982 , Trichloroethylene was identified and quantitated at 1400 µg/l. A lesser amount of Tetrachloroethylene was confirmed at 15 µg/l. Samples 208 and 209 contained 19 µg/l and 21 µg/l Trichloroethylene respectively; Tetrachloroethylene was not detected.

Prior to this report, the samples from July 28, 1982 from site HP were analyzed. Traces of both solvents were found in this set. Though not quantitated, the level of Trichloroethylene seems to be in the range of that which was found in samples 208 and 209. The sample which showed the most contamination relative to the others was 205. Also sample 168 from site TT on July 28, 1982 was analyzed and shown to contain 104 μg/l Tetrachloroethylene.

Conclusion:

Tetrachloroethylene was identified as the contaminant in the well field coded "TT". Its concentration seems relatively stable over the period in which it has been examined. It was confirmed that the well field coded "HP" has shown contamination by Trichloroethylene and Tetrachloroethylene. These levels have been variable over the per studied and are now at significantly lower levels than when first encountered. The following table summarizes the findings:

Sample	Date Taken	Site Code	Tri chloroethylene	Tetra-chloroethylene
206	7-27-82	TT	-	76
207	7-27-82	TT	-	82
86	5-27-82	TT	-	80
168	7-28-82	TT	-	104
208	7-27-82	HP	19	<1
209	7-27-82	HP	21	<1
120	5-27-82	HP	1400	15
205	7-28-82	HP	No Data	1.0

Bruce A. Babson
Bruce A. Babson
Chemist

BAB/ab
Customer #92400

ROUTING SLIP

AUG 13 1982

	ACTION	INFO	INITIAL
BMO		✓	C
ABMO		✓	rwr
ADMIN		✓	S
ENVIOR AFF	✓		
F&A SEC			
MAINT NCO			
M&R			
OPNS			
PROP			
UMACS			
UTIL			
SECRETARY			

COMMENTS: 8-16-82

Danny,
See AC/S Fac request
for interpretation by Betsy
Jenkins

ASSISTANT CHIEF OF STAFF, FACILITIES
HEADQUARTERS, MARINE CORPS BASE

DATE 13 Aug 82

TO:

[✓ BASE MAINT O]	DIR, FAMILY HOUSING
PUBLIC WORKS O	DIR, UNACCOMPANIED PERS HSG
COMM-ELECT O	BASE FIRE CHIEF

ATTN: LT Col. Catta

1. Attached is forwarded for info/action.

Ron.

2. Please initial, or [✓ comment,] and return all papers to this office.
Request you have your chemist provide "lay-man" interpretation of findings. Thank you.

3. Your file copy

Fitz

"LET'S THINK OF A FEW REASONS
WHY IT CAN BE DONE"

MCBCL 5216/21 (REV. 2-81)

0126

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

DDP

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

1. On 6 May 1982, Mike Hargett, of Grainger Labs, called and informed me that on 3 May 1982, while they were analyzing the first set of Trihalomethane samples received from us, interferences possibly from chlorinated hydrocarbons hindered analysis of samples from two systems, Tarawa Terrace and Hadnot Point.

2. It was determined that raw and treated samples from the treatment plants for the two systems would be taken for analysis of the interferring chlorinated hydrocarbons. On 28 July 1982, a raw water sample, #206, and a treated water sample, #207, were taken at the Tarawa Terrace water treatment plant. A raw water sample, #208, and a treated water sample, #209, were taken at the Hadnot Point water treatment plant, on 28 July 1982. The Trihalomethane samples for July were also taken on 28 July 1982, for these two systems. In Grainger's letter, of 10 August 1982, they erroneous report the samplessas taken on 27 July 1982, they were collected and shipped on 28 July 1982.

3. Analysis of the above samples and some Grainger had preserved showed that in the Tarawa Terrace water treatment plant and system, the interferring chlorinated hydrocarbon is tetrachloroethylene, or otherwise known as perchloroethylene. Tetrachloroethylene is used as a dry cleaning and degreasing solvent, and heat-transfer medium, Analysis of the Hadnot Point water treatment plant and system samples showed Trichloroethylene and low levels of tetrachloroethylene. Trichloroethylene is used primarily as a metal degreaser. It is also used as a dry-cleaning solvent and a type of pesticide, fumigant.

4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

5. Tetrachloroethylene, in high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for tetrachloroethylene are 2300 ug/l for 1-day, 175 ug/l for 10-days, and 20 ug/l for longer-term where drinking water is the only source of exposure. On 9 April 1980, EPA came out with a Suggested Action Guidance on Tetrachloroethylene. This guidance was a result of possible tetrachloroethylene contamination of drinking water

CLW

where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/l (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/l (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/l.

6. Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethanes), at high levels , has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for trichloroethylene were determined to be 2 mg/l for 1-day, 0.2 mg/l for 10-day, and 75 ug/l for a chronicsnarl. There is no Suggested Action Guidance on trichloroethylene.

7. Below is a table of the results received from Grainger labs.

				_chloroethylene, ug/l	
Sample #	Sample Date	WTP	Sample Site	Tri-	Tetra-
86	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
158					
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data	100
208	7-28è82	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

8. The level of tetrachloroethylene for the Tarawa Terrace system samples averaged 0.09 mg/l, which exceeded the recommended level of 0.04 mg/l. The levels do not vary significantly between the raw and treated samples. The raw and treated samples were taken at the plant where the water had already traveled some distance in pipes. Therefore, with no significant difference between raw and treated samples and the high average of 0.09 mg/l, I would believe the tetrachloroethylene contamination is possibly do to the use of coated A/C pipe in the raw water lines at Tarawa Terrace.. Tetrachloroethylene, in the Hadnot Point system samples is at trace levels and well under recommended levels.

9. The level of trichloroethylene, at Hadnot Point, is presently averaging 20 ug/l, which is below all three recommended snarls; 1-day, 10-day, and chronic. No explaination is offered for the 1400 ug/l level on 27 May 1982, or why it is now averaging only 20 ug/l.

Elizabeth A. Betz
Supervisory Chemist

Special Testing of
TT + HP plants for
Trichloroethylene + Tetrachloroethylene
Both within limits. Recommend
Sending Data to Plant Div.

TRIHALOMETHANE REPORTS

APRIL 1982 - FEBRUARY 1985

REPORT DATE	SAMPLE DATE(S)	COMMENTS
MAY 6, 1982	APR 19-20, 1982	INITIAL ANALYSIS BY STATE CERTIFIED LABORATORY
JUN 9, 1982	MAY 27-28, 1982	
JUL 13, 1982	JUN 24-25, 1982	
AUG 11, 1982	JUL 28-29, 1982	
DEC 9, 1982	NOV 26&29, 1982	QUARTERLY SAMPLING INITIATED
MAR 16, 1983	FEB 24-25, 1983	
JUN 15, 1983	MAY 27, 1983	
SEP 16, 1983	AUG 25-26, 1983	
JAN 18, 1984	DEC 29-30, 1983	SAMPLING OF LARGE SYSTEMS (HP & NR) ONLY INITIATED
APR 9, 1984	MAR 27-28, 1984	HP SAMPLING REDUCED TO ONE SAMPLING POINT
JUL 10, 1984	JUN 27, 1984	
OCT 3, 1984	SEP 21, 1984	

4th QUARTER 1984 - NO SAMPLING DATA

1st QUARTER 1985 - SAMPLING DONE IN MARCH 1985

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Methods Development
Special Investigation
Pesticides
RCRA

May 6, 1982
82-3637

Commanding General
Marine Corps Base
Camp Lejeune, NC 28542

Attn: AC/S Facilities

Subject: Analysis of samples received 4/26/82

Sample Identification: Purchase Order # M06760C1-82-M2-5084

41 bottles of THM

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
001	1	4	3	2	10
002	1	5	4	2	12
003	1	5	3	2	11
004	1	4	3	2	10
005	1	4	3	2	10
006	3	3	1	<1	7
007	3	1	2	<1	9
008	2	<1	<1	<1	2
009	3	4	2	<1	9
010	3	4	2	<1	9
011	4	4	2	<1	10
012	11	15	20	5	51

Dept. of Navy
GLI #82-3637
May 6, 1982
Page

RESULTS

(cont'd.)

013	13	<1	28	11	73
014	15	28	45	32	120
015	15	25	37	22	99
016	15	24	37	24	100
017	18	8	2	<1	28
018	22	9	2	<1	33
019	24	11	3	<1	38
020	20	13	2	<1	35
021	23	21	3	<1	47
022	29	15	4	<1	48
023	29	14	4	<1	47
024	29	15	4	<1	48
025	28	15	4	<1	46
026	29	15	5	<1	49
027	27	13	4	<1	44
028	27	13	4	<1	44
029	29	13	4	<1	45
030	29	14	4	<1	4
031	38	18	6	<1	62
032	32	5	1	<1	42

Dept. of Navy
GLI #82-3637
May 6, 1982
Page

RESULTS

(cont'd,)

033	41	10	2	<1	53
034	32	9	1	<1	42
035	39	6	<1	<1	45
036	29	9	1	<1	39
037	23	20*	2	<1	45**
038	28	20*	3	<1	51**
039	25	20*	2	<1	47**
040	25	20*	2	<1	47**
041	28	20*	3	<1	51**

* This represents an upper limit on the possible Bromodichloromethane level.

** This represents an upper limit on the possible total trihalomethane level.

NOTE: All results reported in micrograms per liter.

NOTE: All samples were analyzed on May 3, 1982

W. Paul Brafford
W. Paul Brafford
Laboratory Supervisor

WPB:ss
Customer #92400

cc: Attn: NREAB, QC Lab, Commanding General, Department of Navy,
Base Maintenance Div., Marine Corp. Base, Camp Lejeune, NC 28542

CLW

TRIHALOMETHANE SAMPLING

MONTH: APRIL
YEAR: 1982

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Tarawa Terrace	Sampler: LACHAPELLE + BETZ Date: 19 APR 82	
001	Bldg STT-39A, Water Plant @ 1st Pump	1341
002	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink	1334
003	Bldg TT-48, TT Elem School II, Men's Head across Office	1410
004	Bldg TT-2453, TT Exchange gas Station's Ladies Room	1350
005	Bldg TT-35, Sewage Plant's Office Sink	1358
WTP:	Sampler: LACHAPELLE + BETZ Date: 19 APR 82	
006	Bldg E-23, Sewage Lift Station, Knox Trailer Park	1430
WTP: Montford Point	Sampler: LACHAPELLE + BETZ Date: 19 APR 82	
007	Bldg M-178, Water Plant @ Sink faucet	1445
008	Bldg M-625, Steam Plant, Bathroom Sink	1438
009	Bldg M-128, Branch Clinic, Men's Head	1452
010	Bldg M-136, Sewage Plant Sink	1459
011	Bldg M-231, BOQ, 1st floor Men's Head	1510
WTP: New River	Sampler: HUNEYCUTT + BETZ Date: 20 APR 82	
012	Bldg AS-110, Water Plant @ Pump	1255
013	Bldg G-520, Career Planner, 2nd floor Men's Room	1345
014	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	1310
015	Bldg 710, Officer's Club Gally Sink	1325
016	Bldg 2800, Boat Marina Men's Room	1335
WTP: Holcomb Blvd	Sampler: HUNEYCUTT + BETZ Date: 20 APR 82	
017	Bldg 670, Water Plant @ Pump	1425
018	Bldg 4022, Fire Station, Bathroom Sink	1410
019	Bldg 1915, Golf Course, Men's Locker Room	1435
020	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom	1455
021	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink	[illegible]

TRIHALOMETHANE SAMPLING

MONTH: April
YEAR: 1982

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Rifle Range	Sampler: Monahan + Betz Date: 21 Apr 1982	
022	Bldg RR-85, Water Plant @ Finish Tap	1235
023	Bldg RR-6, Fire House Sink	1243
024	Bldg RR-10, Snack Bar Sink	1250
025	Bldg RR-200, Across from Target Shed	1320
026	Bldg RR-92, Sewage Plant Sink	1330
WTP: Courthouse Bay	Sampler: Monahan + Betz Date: 21 Apr 1982	
027	Bldg BB-190, Water Plant @ Faucet	1435
028	Bldg BB-7, Mess Hall Sink	1415
029	Bldg BB-54, Service Club	1425
030	Bldg SBB-204, Sewage Plant Sink	1405
031	Bldg BB-46, Marina Bathroom Sink	1352
WTP: Onslow Beach	Sampler: Monahan + Betz Date: 21 Apr 1982	
032	Bldg BA-138, Water Plant	1448
034 ~~033~~	Bldg BA-103, Mess Hall	1515 ~~1505~~
033 ~~034~~	Campsite #2, Spigot 10(Mainland)	1505 ~~1515~~
035	Campsite #1, Spigot 2(Beachside)	1530
036	Bldg SBA-142, Spigot at bottom of Pier	1523
WTP: Hadnot Point	Sampler: Huneycutt + Betz Date: 22 Apr 1982	
037	Bldg20, Water Plant @ Pump	1400
038	Bldg NH-1, Emergency Room Sink	1410
039	Bldg 1202, Men's Room Sink	1500
040	Bldg 65, Quality Control Lab, Room 220 Sink	1530
041	Bldg FC-530, Laundry Room Sink, 1st floor	1515

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Process Development
Quality Control
Methods Development
Special Investigation
Pesticides
RCRA

June 9, 1982
82-3869

Commanding General
Marine Corps Base
Camp Lejeune, NC 28542

Attn: AC/S Facilities

Subject: Analysis of samples received 6/1/82

Sample Identification: Purchase Order # M06760Ci-82-M2-5084

36 bottles of THM

RESULTS

(See attached sheets)

W. Paul Brafford

W. Paul Brafford
Laboratory Supervisor

WPB:ss

Customer #92400

cc: Attn: Elizebeth Betz, NREAB, QC Lab, Commanding General,
Department of Navy, Base Maintenance Div., Marine Corp. Base, Camp
Lejeune, NC 28542

Commanding General
GLI #82-3869
June 9, 1982
Page 2

RESULTS

Sample	Chloroform	Bromodichloromethane	Chlorodibromomethane	Bromoform	Total Trihalomethane	Date Completed
83	1	4	3	2	10	6/8/82
84	2	6	5	3	16	6/8/82
85	2	5	5	3	15	6/8/82
86	1	4	4	2	11	6/8/82
87	1	4	3	2	10	6/8/82
89	2	3	2	1	8	6/8/82
90	<1	<1	<1	<1	<1	6/8/82
91	2	3	2	<1	7	6/8/82
92	1	3	2	<1	6	6/8/82
93	2	4	3	1	10	6/8/82
94	5	10	17	8	40	6/9/82
95	12	25	40	19	96	6/9/82
96	7	15	30	18	70	6/9/82
97	8	18	36	21	83	6/9/82
98	10	24	46	25	105	6/9/82
99	14	6	3	<1	23	6/8/82
100	15	7	4	<1	26	6/8/82
101	24	10	6	<1	40	6/8/82
102	16	8	4	<1	28	6/8/82
103	20	9	4	<1	33	6/8/82
104	25	13	5	<1	43	6/9/82
105	25	12	5	<1	42	6/9/82
106	25	13	5	<1	43	6/9/82

RESULTS
(cont'd.)

107	32	16	7	<1	55	6/9/82
108	23	11	5	<1	39	6/9/82
109	24	11	4	<1	39	6/4/82
110	23	10	4	<1	37	6/4/82
111	20	9	3	<1	32	6/4/82
112	21	9	3	<1	33	6/4/82
113	30	14	5	<1	49	6/4/82
114	24	7	1	<1	32	6/8/82
115	36	9	2	<1	47	6/8/82
116	47	11	3	<1	61	6/8/82
117	42	7	1	<1	50	6/8/82
118	35	6	1	<1	42	6/8/82
119	13	10*	4	<1	27**	6/8/82
120	15	10*	4	<1	29**	6/8/82
121	14	10*	4	<1	28**	6/8/82
122	12	10*	3	<1	25**	6/8/82
123	14	10*	4	<1	28**	6/8/82

*This represents a probable upper limit on the concentration of Bromodichloromethane; there is interference in this set by an unknown compound.

**Likewise, these represent a probable upper limit on the total THM content.

SPECIAL NOTE

Samples 042 through 082 (omitting 047) were rejected due to improper sampling as explained by Mike Hargett in his 6/4/82 letter to Ms. Elizabeth Betz.

NOTE: All results reported in micrograms per liter.

TRIHALOMETHANE SAMPLING

MONTH: May
YEAR: 1982

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Tarawa	Terrace Sampler: Huneycutt Date: 28 May 1982	
083	Bldg STT-39A, Water Plant @ 1st Pump	1015
084	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink	0923
085	Bldg TT-48, TT Elem School II, Men's Head across Office	0954
086	Bldg TT-2453, TT Exchange gas Station's Ladies Room	0939
087	Bldg TT-35, Sewage Plant's Office Sink	0948
WTP: Not Collected	Sampler: ~~Huneycutt~~ Date: ~~26 May 82~~	Not Collected
088	Bldg E-23, Sewage Lift Station, Knox Trailer Park	Not Collected
WTP: Montford Point	Sampler: Huneycutt Date: 28 May 1982	
089	Bldg M-178, Water Plant @ Sink faucet	1034
090	Bldg M-625, Steam Plant, Bathroom Sink	1028
091	Bldg M-128, Branch Clinic, Men's Head	1040
092	Bldg M-136, Sewage Plant Sink	1053
093	Bldg M-231, BOQ, 1st floor Men's Head	1045
WTP: New River	Sampler: Huneycutt Date: 28 May 1982	
094	Bldg AS-110, Water Plant @ Pump	1125
095	Bldg G-520, Career Planner, 2nd floor Men's Room	1110
096	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	1135
097	Bldg 710, Officer's Club Gally Sink	1155
098	Bldg 2800, Boat Marina Men's Room	1145
WTP: Holcomb Blvd	Sampler: Huneycutt Date: 27 May 1982	
099	Bldg 670, Water Plant @ Pump	1022
100	Bldg 4022, Fire Station, Bathroom Sink	1033
101	Bldg 1915, Golf Course, Men's Locker Room	1045
102	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom	~~1185~~ 1105
103	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink	1055

CLW

TRIHALOMETHANE SAMPLING

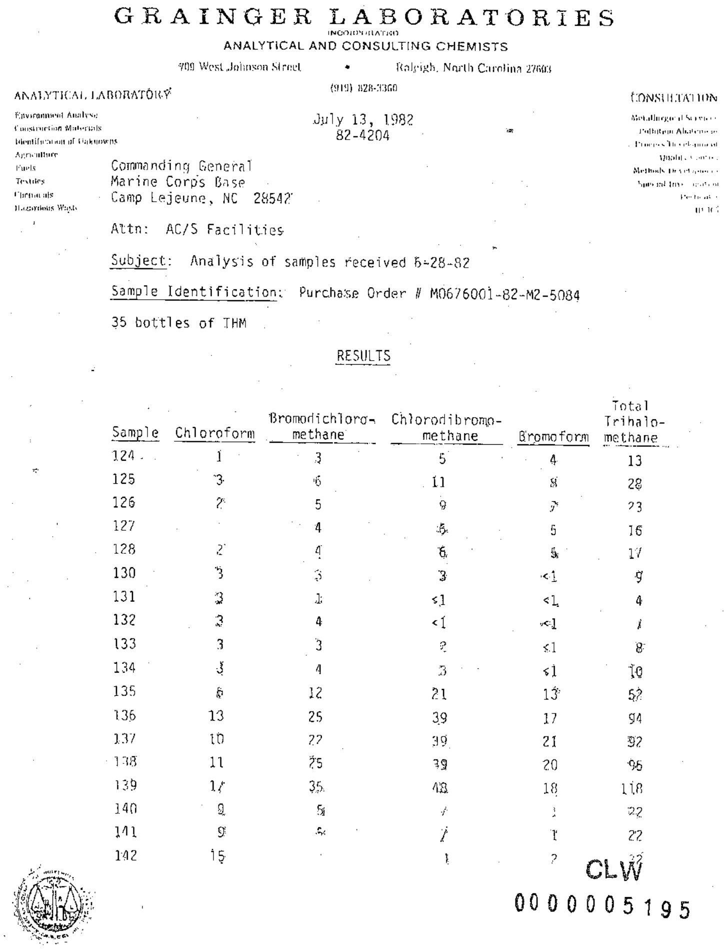
MONTH: May
YEAR: 1982

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Rifle Range	Sampler: Honeycutt Date: 28 May 1982	
104	Bldg RR-85, Water Plant @ Finish Tap	1223
105	Bldg RR-6, Fire House Sink	1226
106	Bldg RR-10, Snack Bar Sink	1245
107	Bldg RR-200, Across from Target Shed	1230
108	Bldg RR-92, Sewage Plant Sink	1237
WTP: Courthouse Bay	Sampler: Date:	
109	Bldg BB-190, Water Plant @ Faucet	
110	Bldg BB-7, Mess Hall Sink	
111	Bldg BB-54, Service Club	
112	Bldg SBB-204, Sewage Plant Sink	
113	Bldg BB-46, Marina Bathroom Sink	
WTP: Onslow Beach	Sampler: Honeycutt Date: 27 May 1982	
114	Bldg BA-138, Water Plant @ Faucet	1405
115	Bldg BA-103, Mess Hall	1425
116	Campsite #2, Spigot 10(Mainland)	1415
117	Campsite #1, Spigot 2(Beachside)	1445
118	Bldg SBA-142, Spigot at bottom of Pier	1435
WTP: Hadnot Point	Sampler: Honeycutt Date: 27 May 1982	
119	Bldg20, Water Plant @ Pump	1133
120	Bldg NH-1, Emergency Room Sink	1123
121	Bldg 1202, Men's Room Sink	~~1133~~ 1333
122	Bldg 65, Quality Control Lab, Room 220 Sink	1315
123	Bldg FC-530, Laundry Room Sink, 1st floor	1345

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Rifle Range	Sampler: Date:	
	Bldg RR-85, Water Plant @ Finish Tap	
	Bldg RR-6, Fire House Sink	
	Bldg RR-10, Snack Bar Sink	
	Bldg RR-200, Across from Target Shed	
	Bldg RR-92, Sewage Plant Sink	
WTP: Courthouse Bay	Sampler: Date: 5-28-82	
109	Bldg BB-190, Water Plant @ Faucet	410
110	Bldg BB-7, Mess Hall Sink	1455
111	Bldg BB-54, Service Club	1435
112	Bldg SBB-204, Sewage Plant Sink	1500
113	Bldg BB-46, Marina Bathroom Sink	1450
WTP: Onslow Beach	Sampler: Date:	
	Bldg BA-138, Water Plant	
	Bldg BA-103, Mess Hall	
	Campsite #2, Spigot 10(Mainland)	
	Campsite #1, Spigot 2(Beachside)	
	Bldg SBA-142, Spigot at bottom of Pier	
WTP: Hadnot Point	Sampler: Date:	
	Bldg20, Water Plant @ Pump	
	Bldg NH-1, Emergency Room Sink	
	Bldg 1202, Men's Room Sink	
	Bldg 65, Quality Control Lab, Room 220 Sink	
	Bldg FC-530, Laundry Room Sink, 1st floor	



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Special Investigation
Pesticides
[illegible]

July 13, 1982
82-4204

Commanding General
Marine Corps Base
Camp Lejeune, NC 28542

Attn: AC/S Facilities

Subject: Analysis of samples received 6-28-82

Sample Identification: Purchase Order # M0676001-82-M2-5084

35 bottles of THM

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
124	1	3	5	4	13
125	3	6	11	8	28
126	2	5	9	7	23
127		4	6	5	16
128	2	4	6	5	17
130	3	3	3	<1	9
131	3	1	<1	<1	4
132	3	4	<1	<1	7
133	3	3	2	<1	8
134	3	4	3	<1	10
135	6	12	21	13	52
136	13	25	39	17	94
137	10	22	39	21	92
138	11	25	39	20	95
139	17	35	48	18	118
140	9	5	7	1	22
141	9	5	7	1	22
142	15		1	2	22

Dept of the Navy
GLI #82-4204
July 13, 1982
Page 2

RESULTS
(cont.)

143	14	[illegible]	8		30
144	14	7	8		30
145	36	17	7		60
146	33	15	[illegible]		55
147	[illegible]	19	7		68
148	41	17	7	1	66
149	38	17	6		62
150	21	13	3		43
51	24	15	9		49
152	20	12	7		40
153	23	15	8	1	47
154	38	23	2	[illegible]	64
155	35	8	[illegible]	<1	44
156	46	11	2	<1	59
157	54	11	3	<1	68
158	51	11	3	<1	65
159	54	12	2	<1	68
160	3	*5	5	1	14 **
161	4	*5	[illegible]	[illegible]	15 **
162	[illegible]	*5	6		15 **
163	3	*5		[illegible]	14 **
164	2	*5	5	[illegible]	13 **

* Represents an upper limit on the possible Bromodichloromethane level
** Represents an upper limit on the possible total Trihalomethane.

NOTE: All results reported in micrograms per liter.
All samples completed on July 8, 1982.

W. Paul Brafford
W. Paul Brafford
Laboratory Supervisor

WPB/ab

TRIHALOMETHANE SAMPLING

MONTH: JUNE
YEAR: 1982

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Tarawa Terrace	Sampler: HUNEYCUTT Date: 24 JUNE 1982	
[illegible]	Bldg STT-39A, Water Plant @ 1st Pump	1320
[illegible]	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink	1310
126	Bldg TT-48, TT Elem School II, Men's Head across Office	1340
127	Bldg TT-2453, TT Exchange gas Station's Ladies Room	1325
128	Bldg TT-35, Sewage Plant's Office Sink	1333
WTP:	Sampler: Date:	
129	Bldg E-23, Sewage Lift Station, Knox Trailer Park	NOT COLLECTED
WTP: Montford Point	Sampler: HUNEYCUTT Date: 24 JUNE 1982	
130	Bldg M-178, Water Plant @ Sink faucet	1358
131	Bldg M-625, Steam Plant, Bathroom Sink	~~19~~ 1353
132	B · SEPTUM RECEIVED INVERTED Bldg M-128, Branch Clinic, Men's Head	1403
133	Bldg M-136, Sewage Plant Sink	1415
134	Bldg M-231, BOQ, 1st floor Men's Head	1410
WTP: New River	Sampler: HUNEYCUTT Date: 25 JUNE 1982	
135	Bldg AS-110, Water Plant @ Pump	1005
136	Bldg G-520, Career Planner, 2nd floor Men's Room	0953
137	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	1020
138	Bldg 710, Officer's Club Gally Sink	1045
139	Bldg 2800, Boat Marina Men's Room	1035
WTP: Holcomb Blvd	Sampler: HUNEYCUTT Date: 25 JUNE 1982	
140	Bldg 670, Water Plant @ Pump	0925
141	Bldg 4022, Fire Station, Bathroom Sink	0930
142	Bldg 1915, Golf Course, Men's Locker Room	0855
143	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom	0915
144	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink TURBIDITY	0905

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION		TIME
WTP: Rifle Range	Sampler: Huneycutt	Date: 25 JUNE 1982	
145	Bldg RR-85, Water Plant @ Finish Tap		1115
146	Bldg RR-6, Fire House Sink		1120
147	Bldg RR-10, Snack Bar Sink		1145
148	Bldg RR-200, Across from Target Shed		1130
149	Bldg RR-92, Sewage Plant Sink		1138
WTP: Courthouse Bay	Sampler: HONEYCUTT	Date: 25 JUNE 1982	
150	Bldg BB-190, Water Plant @ Faucet		1208
151	Bldg BB-7, Mess Hall Sink		1225
152	Bldg BB-54, Service Club		1230
153	Bldg SBB-204, Sewage Plant Sink		1220
154	Bldg BB-46, Marina Bathroom Sink		1213
WTP: Onslow Beach	Sampler: Burns + Monahan	Date: 25 June 82	
155	Bldg BA-138, Water Plant		1330
156	Bldg BA-103, Mess Hall		1345
157	Campsite #2, Spigot 10(Mainland)		1322
158	Campsite #1, Spigot 2(Beachside)		1400
159	Bldg SBA-142, Spigot at bottom of Pier		1350
WTP: Hadnot Point	Sampler: Burns + Monahan	Date: 25 June 82	
160	Bldg20, Water Plant @ Pump		1440
161	Bldg NH-1, Emergency Room Sink		1455
162	Bldg 1202, Men's Room Sink		1435
163	Bldg 65, Quality Control Lab, Room 220 Sink		1510
164	Bldg FC-530, Laundry Room Sink, 1st floor		1415

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Fuels
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Hazardous Waste

CONSULTATION
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Process Development
Quality Control
Methods Development
Special Investigation
Pesticides
RCRA

August 11, 1982
82-4488

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples received 8/2/82

Sample Identification:

	Date	Sample #	WTP	Time
1.	July 28, 1982	165 A&B*	TT	1005
2.	July 28, 1982	166 A&B	TT	0955
3.	July 28, 1982	167 A&B	TT	1030
4.	July 28, 1982	168 A&B	TT	1013
5.	July 28, 1982	169 A&B	TT	1020
6.	July 29, 1982	171 A&B	MP	1227
7.	July 29, 1982	172 A&B	MP	1257
8.	July 29, 1982	173 A&B	MP	1235
9.	July 29, 1982	174 A&B	MP	1250
10.	July 29, 1982	175 A&B	MP	1240
11.	July 29, 1982	176 A&B*	NR	1110
12.	July 29, 1982	177 A&B	NR	1209
13.	July 29, 1982	178 A&B	NR	1122
14.	July 29, 1982	179 A&B	NR	1145
15.	July 29, 1982	180 A&B	NR	1135
16.	July 29, 1982	181 A&B*	HB	1337
17.	July 29, 1982	182 A&B	HB	1345
18.	July 29, 1982	183 A&B	HB	1356
19.	July 29, 1982	184 A&B	HB	1415
20.	July 29, 1982	185 A&B	HB	1404
21.	July 29, 1982	186 A&B*	RR	1019

Sample Identification
(Continued)

22. July 29, 1982	187 A&B	RR	1023
23. July 29, 1982	188 A&B	RR	1047
24. July 29, 1982	189 A&B	RR	1030
25. July 29, 1982	190 A&B	RR	1040
26. July 29, 1982	191 A&B*	CHB	1000
27. July 29, 1982	192 A&B	CHB	0941
28. July 29, 1982	193 A&B	CHB	0954
29. July 29, 1982	194 A&B	CHB	0948
30. July 29, 1982	195 A&B	CHB	0936
31. July 29, 1982	196 A&B*	OB	0907
32. July 29, 1982	197 A&B	OB	0848
33. July 29, 1982	198 A&B	OB	0912
34. July 29, 1982	199 A&B	OB	0840
35. July 29, 1982	200 A&B	OB	0856
36. July 28, 1982	201 A&B*	HP	1100
37. July 28, 1982	202 A&B	HP	1413
38. July 28, 1982	203 A&B	HP	1347
39. July 28, 1982	204 A&B	HP	1425
40. July 28, 1982	205 A&B	HP	1358

* Sample point not required by SDWA

RESULTS

Sample	Chloroform	Bromodichloro-Methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
1	<1	3	4	2	9
2	<1	6	9	5	20
3	<1	5	8	4	17
4	4	11	16	8	39
5	<1	3	4	2	9

Camp Lejeune
GLI 82-4488
August 11, 1982
Page 3

RESULTS
(cont.)

6	1	3	3	1	8
7	<1	2	1	<1	3
8	1	3	3	1	8
9	<1	2	1	<1	3
10	<1	3	3	1	7
11	1	9	25	29	64
12	7	25	54	40	126
13	3	14	39	38	94
14	2	13	38	41	94
15	6	24	60	45	135
16	3	6	5	2	16
17	6	8	7	2	23
18	10	10	8	2	30
19	7	8	7	3	25
20	7	9	8	2	26
21	26	12	5	<1	43
22	26	12	5	<1	43
23	29	13	5	<1	47
24	33	16	7	<1	56
25	25	12	5	<1	42
26	24	9	3	<1	36
27	23	8	3	<1	34
28	25	9	3	<1	37
29	20	12	7	<1	39
30	47	15	5	<1	67
*31	8	2	1	<1	11
32	34	9	2	<1	45
33	30	7	1	<1	38
34	35	9	2	<1	46
35	38	10	2	<1	50

Camp Lejeune
GLI 82-4488
August 11, 1982
Page 4

RESULTS
(cont.)

36	16	20**	5	<1	41***
37	19	20**	6	<1	45***
38	17	20**	5	<1	42***
39	17	20**	5	<1	42***
40	21	20**	6	<1	47***

* Both Duplicates contained large air bubbles.

** Represents an upper limit on the Bromodichloromethane level.

*** Represents an upper limit on the total Trihalomithane Level.

NOTE: All results reported in micrograms per liter.
Analyses completed 8/10/82.

W. Paul Brafford
W. Paul Brafford
Laboratory Supervisor

WPB/ab
Customer #92400

cc: Attn: Elizabeth Batz, NREAB, OC Lab, Commanding General,
Department of Navy, Base Maintenance Div., Marine Corp. Base, Camp
Lejeune, NC 28542

TRIHALOMETHANE SAMPLING

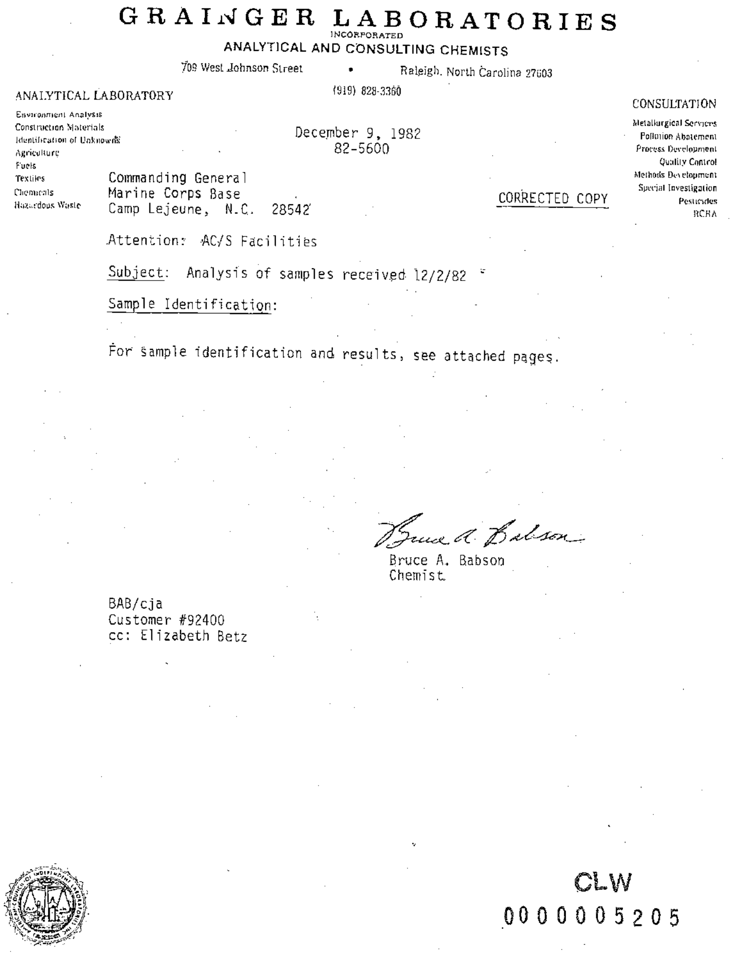
MONTH: JULY
YEAR: 1982

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Tarawa Terrace	Sampler: H [illegible] Date: 28 JULY 1982	
165	Bldg STT-39A, Water Plant @ 1st Pump	1005
166	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink	0955
167	Bldg TT-48, TT Elem School II, Men's Head across Office	1030
168	Bldg TT-2453, TT Exchange gas Station's Ladies Room	10[illegible]
169	Bldg TT-35, Sewage Plant's Office Sink	1020
WTP:	Sampler: Date:	
170	Bldg E-23, Sewage Lift Station, Knox Trailer Park	NOT COLLECTED
WTP: Montford Point	Sampler: Date: 29 JULY 1982	
171	Bldg M-178, Water Plant @ Sink faucet	1227
172	Bldg M-625, Steam Plant, Bathroom Sink	1257
173	Bldg M-128, Branch Clinic, Men's Head	1235
174	Bldg M-136, Sewage Plant Sink	1250
175	Bldg M-231, BOQ, 1st floor Men's Head	1240
WTP: New River	Sampler: Date: 29 JULY 1982	
176	Bldg AS-110, Water Plant @ Pump	1110
177	Bldg G-520, Career Planner, 2nd floor Men's Room	1209
178	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	1122
179	Bldg 710, Officer's Club Gally Sink	1145
180	Bldg 2800, Boat Marina Men's Room	1135
WTP: Holcomb Blvd	Sampler: Date: 29 JULY 1982	
181	Bldg 670, Water Plant @ Pump	1337
182	Bldg 4022, Fire Station, Bathroom Sink	1345
183	Bldg 1915, Golf Course, Men's Locker Room	1356
184	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom	1415
185	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink	1404

TRIHALOMETHANE SAMPLING

MONTH: JULY
YEAR: 1982

SAMPLE##	SAMPLE LOCATION	TIME
WTP: Rifle Range	Sampler: Date: 29 JULY 1982	
186	Bldg RR-85, Water Plant @ Finish Tap	1019
187	Bldg RR-6, Fire House Sink	1023
188	Bldg RR-10, Snack Bar Sink	1047
189	Bldg RR-200, Across from Target Shed	1030
190	Bldg RR-92, Sewage Plant Sink	1040
WTP: Courthouse Bay	Sampler: Huneycutt + Lachapelle Date: 29 July 82	
191	Bldg BB-190, Water Plant @ Faucet	1000
192	Bldg BB-7, Mess Hall Sink	0941
193	Bldg BB-54, Service Club	0954
194	Bldg SBB-204, Sewage Plant Sink	0948
195	Bldg BB-46, Marina Bathroom Sink	0936
WTP: Onslow Beach	Sampler: Huneycutt + Lachapelle Date: 29 July	
196	Bldg BA-138, Water Plant	0907
197	Bldg BA-103, Mess Hall	0848
198	Campsite #2, Spigot 10(Mainland)	~~[illegible]~~ 0912
199	Campsite #1, Spigot 2(Beachside)	0840
200	Bldg SBA-142, Spigot at bottom of Pier	0856
WTP: Hadnot Point	Sampler: HUNEYCUTT + LACHAPELLE Date: 28 JULY 1982	
201	Bldg20, Water Plant @ Pump	1100
202	Bldg NH-1, Emergency Room Sink	1413
203	Bldg 1202, Men's Room Sink	1347
204	Bldg 65, Quality Control Lab, Room 220 Sink	1425
205	Bldg FC-530, Laundry Room Sink, 1st floor	1358



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December 9, 1982
82-5600

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

CORRECTED COPY

Attention: AC/S Facilities

Subject: Analysis of samples received 12/2/82

Sample Identification:

For sample identification and results, see attached pages.

Bruce A. Babson

Bruce A. Babson
Chemist

BAB/cja
Customer #92400
cc: Elizabeth Betz

Page Referenced

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
*261	4	2	<5	4	<15
*262	1	1	<5	2	<9
*263	2	2	<5	5	<14
*264	2	2	<5	4	<13
*265	1	2	<5	4	<12
266	3	3	3	<1	9
267	4	2	2	<1	8
268	3	2	3	<1	8
269	3	3	3	<1	9
270	3	3	3	<1	9
271	4	8	18	19	49
272	7	21	48	51	127
273	6	17	40	50	113
274	5	15	34	37	91
275	7	21	48	49	125
276	15	6	2	<1	23
277	17	7	3	<1	27
278	20	9	4	<1	33
279	28	10	5	<1	43
280	20	8	3	<1	31
281	36	12	4	<1	52
282	34	12	4	<1	50
283	37	13	4	<1	54
284	40	13	4	<1	57
285	35	12	4	<1	51

RESULTS
(con't)

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
286	21	11	5	<1	37
287	21	11	5	<1	37
288	21	11	4	<1	36
289	26	13	5	<1	44
290	45	20	8	<1	73
291	20	5	2	<1	27
292	28	3	1	<1	32
293	32	7	1	<1	40
294	38	5	1	<1	44
295	37	3	<1	<1	40
**296	20	<20	<5	<1	<45
**297	22	<20	<5	<1	<47
**298	29	<20	<5	<1	<54
**299	20	<20	<5	<1	<45
**300	28	<20	<5	<1	<53

*All samples from this site show contamination from Tetrachloroethylene. This compound interferes with the determination of Chlorodibromomethane. The reported value represents a probable maximum on the level of this trihalomethane.

**All samples from this site show contamination from Trichloroethylene and Tetrachloroethylene. These compounds interfere with the determinations for both Bromodichloromethane and Chlorodibromomethane. The reported values represent a probable maximum on the levels of these two trihalomethanes.

NOTE: All results reported in micrograms per liter.
Analysis completed 12/8/82.

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Tarawa Terrace	Sampler: LAchApelle Date: 11-~~26~~ 29-82	
261	Bldg STT-39A, Water Plant @ 1st Pump	~~1447~~ 0955
262	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink	1000
263	Bldg TT-48, TT Elem School II, Men's Head across Office	1015
264	Bldg TT-2453, TT Exchange gas Station's Ladies Room	~~752~~ 1005
265	Bldg TT-35, Sewage Plant's Office Sink	~~[illegible]~~ 1009
WTP: NOT COLLECTED	Sampler: Date:	
	Bldg E-23, Sewage Lift Station, Knox Trailer Park	
WTP: Montford Point	Sampler: LAchApelle Date: 11-~~28~~ 29-82	
266	Bldg M-178, Water Plant @ Sink faucet	~~[illegible]~~ 1027
267	Bldg M-625, Steam Plant, Bathroom Sink	~~[illegible]~~ 1032
268	Bldg ~~M-128~~ M-19, ~~Branch Clinic~~ SNACK BAR, ~~Men's Head~~ SINK	1038
269	Bldg M-136, Sewage Plant Sink	~~1446~~ 1043
270	Bldg M-231, BOQ, 1st floor Men's Head	~~[illegible]~~ 1049
WTP: New River	Sampler: LAchApelle Date: 11-29-82	
271	Bldg AS-110, Water Plant @ Pump	1115
272	Bldg G-520, Career Planner, 2nd floor Men's Room	1150
273	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	1202
274	Bldg 710, Officer's Club Gally Sink	1141
275	Bldg 2800, Boat Marina Men's Room	1133
WTP: Holcomb Blvd	Sampler: LAchApelle Date: 11/26/82	
276	Bldg 670, Water Plant @ Pump	0944
277	Bldg 4022, Fire Station, Bathroom Sink	1005
278	Bldg 1915, Golf Course, Men's Locker Room	1015
279	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom	1034
280	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink	1022

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION	TIME
	WTP: Rifle Range Sampler: LAchapelle Date: 11-29-82	
281	Bldg RR-85, Water Plant @ Finish Tap	1236
282	Bldg RR-6, Fire House Sink	1240
283	Bldg RR-10, Snack Bar Sink	1303
284	Bldg RR-200, Across from Target Shed	1245
285	Bldg RR-92, Sewage Plant Sink	1256
	WTP: Courthouse Bay Sampler: Date: 11 21	
286	Bldg BB-190, Water Plant @ Faucet	1332
287	Bldg BB-7, Mess Hall Sink	1335
288	Bldg BB-54, Service Club	~~1348~~ 1349
289	Bldg SBB-204, Sewage Plant Sink	1338
290	Bldg BB-46, Marina Bathroom Sink	1343
	WTP: Onslow Beach Sampler: Date: 11-29	
291	Bldg BA-138, Water Plant	1400
292	Bldg BA-103, Mess Hall	1426
293	Campsite #2, Spigot 10(Mainland)	1410
294	Campsite #1, Spigot 2(Beachside)	~~1432~~ 1440
295	Bldg SBA-142, Spigot at bottom of Pier	1432
	WTP: Hadnot Point Sampler: LAchapelle Date: 11-26-82	
296	Bldg20, Water Plant @ Pump	1047
297	Bldg NH-1, Emergency Room Sink	1056
298	Bldg 1202, Men's Room Sink	1109
299	Bldg 65, Quality Control Lab, Room 220 Sink	1138
300	Bldg FC-530, Laundry Room Sink, 1st floor	1122

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CONSULTATION
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Special Investigation
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March 16, 1983
83-6478

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of Samples Received 3-2-83

Sample Identification: Purchase Order No. M 67001-82-M-5084

RESULTS

Sample	Chloroform	Bromodichloromethane	Chlorodibromomethane	Bromoform	Total Trihalomethanes
323	<1	2	6	5	13
324	<1	2	7	7	16
*324	<1	3	7	7	17
325	1	3	9	9	22
326	<1	2	7	7	16
327	1	4	11	13	29
328	1	3	3	<1	7
329	2	3	3	<1	8
331	1	2	2	<1	5
332	1	2	2	<1	5
333	5	7	20	26	58
334	6	18	49	58	131
335	7	14	39	48	108
336	5	15	39	49	108
337	5	13	37	47	102

RESULTS
(Continued)

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methanes
338	21	5	2	<1	28
339	23	5	1	<1	29
340	24	8	4	<1	36
341	24	5	1	<1	30
342	26	7	3	<1	36
343	30	10	3	<1	43
*343	30	10	3	<1	43
344	32	11	3	<1	46
345	33	11	3	<1	47
346	42	14	4	<1	60
347	35	12	4	<1	51
348	25	10	4	<1	39
349	22	10	4	<1	36
350	23	10	4	<1	37
351	26	11	4	<1	41
352	31	13	5	<1	49
*352	31	13	5	<1	49
353	32	9	3	<1	44
358	17	**20	3	<1	***40
359	35	**20	6	<1	***61
360	18	**20	3	<1	***41

RESULTS
(Continued)

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methanes
361	18	**20	3	<1	***41
362	18	**20	3	<1	***41

NOTE: All results reported in micrograms per liter.
Analysis completed 3/11/83.

*Analyzed in Duplicate.

**Reported value represents a probable upper limit on the Bromodichloromethane concentration. In this sample set Trichloroethylene interferes with the Bromodichloromethane determination.

***Reported value represents a probable upper limit on the Total Trihalomethane concentration.

Bruce A. Babson

Bruce A. Babson
Chemist

BAB/dd
Customer #92400
cc: Elizabeth Betz

TRIHALOMETHANE SAMPLING

MONTH: FEBRUARY
YEAR: 1983

SAMPLE #	SAMPLE LOCATION		TIME
WTP: Tarawa Terrace	Sampler:	Date: 2/24/83	
323	Bldg STT-39A, Water Plant @ 1st Pump		1428
324	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink		432
325	Bldg TT-48, TT Elem School II, Men's Head across Office		[illegible]
326	Bldg TT-2453, TT Exchange gas Station's Ladies Room		1421
327	Bldg TT-35, Sewage Plant's Office Sink		[illegible]
WTP:	Sampler:	Date:	
No SAMPLE	Bldg E-23, Sewage Lift Station, Knox Trailer Park		
WTP: Montford Point	Sampler:	Date:	
328	Bldg M-178, Water Plant @ Sink faucet		[illegible]
329	Bldg M-625, Steam Plant, Bathroom Sink		358
330	Bldg M-128, Branch Clinic, Men's Head		[illegible]
331	Bldg M-136, Sewage Plant Sink		[illegible]
332	Bldg M-231, BOQ, 1st floor Men's Head		47
WTP: New River	Sampler:	Date: 25 Feb 83	
333	Bldg AS-110, Water Plant @ Pump	25 Feb 83	1245
334	Bldg 6-520, Career Planner, 2nd floor Men's Room		1332
335	Bldg AS-4025, Barracks Rec Room, Bathroom Sink		1257
336	Bldg 710, Officer's Club Gally Sink		1320
337	Bldg 2800, Boat Marina Men's Room		1310
WTP: Holcomb Blvd	Sampler:	Date: 2-25-83	
338	Bldg 670, Water Plant @ Pump		1356
339	Bldg 4022, Fire Station, Bathroom Sink		1431
340	Bldg 1915, Golf Course, Men's Locker Room		1402
341	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom		1421
342	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink		1410

TRIHALOMETHANE SAMPLING

MONTH: FEBRUARY
YEAR: 1983

SAMPLE #	SAMPLE LOCATION		TIME
WTP: Rifle Range	Sampler:	Date:	
343	Bldg RR-85, Water Plant @ Finish Tap	25Feb83	1141
344	Bldg RR-6, Fire House Sink		1144
345	Bldg RR-10, Snack Bar Sink		1200
346	Bldg RR-200, Across from Target Shed		1153
347	Bldg RR-92, Sewage Plant Sink		1149
WTP: Courthouse Bay	Sampler:	Date: 2/25/83	
348	Bldg BB-190, Water Plant @ Faucet		0852
349	Bldg BB-7, Mess Hall Sink		0847
350	Bldg BB-54, Service Club		0856
351	Bldg SBB-204, Sewage Plant Sink		0834
352	Bldg BB-46, Marina Bathroom Sink		0841
WTP: Onslow Beach	Sampler:	Date:	
353	Bldg BA-138, Water Plant		508
354	Bldg BA-103, Mess Hall	Closed Sewage Plant	1018
355	Campsite #2, Spigot 10(Mainland)	Water Cut off	
356	Campsite #1, Spigot 2(Beachside)	Water Cut off BA 147 Caretakers office	0958
357	Bldg SBA-142, Spigot at bottom of Pier	Water Cut BA-130 Motor T	26
WTP: Hadnot Point	Sampler:	Date: 2-25-83	
358	Bldg20, Water Plant @ Pump		1525
359	Bldg NH-1, Emergency Room Sink		1515
360	Bldg 1202, Men's Room Sink		1445
361	Bldg 65, Quality Control Lab, Room 220 Sink		1530
362	Bldg FC-530, Laundry Room Sink, 1st floor		1453

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June 15, 1983
83-7405

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of Samples Received 5/31/83

Sample Identification: Purchase Order No. M67001-83-M-0181

37 Samples for Trihalomethane Analysis Identified as in "Results" Section.

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
363	<1	2	4	6	12
364	<1	1	3	5	9
365	<1	1	4	5	10
366	<1	1	3	4	8
367	<1	1	3	5	9
368	1	3	3	<1	7
369	1	2	2	<1	5
370	2	4	3	2	11
371	2	3	3	1	9
372	1	3	3	<1	7
373	2	6	15	25	48
374	NO SAMPLE SUBMITTED				
375	2	7	23	52	84
376	3	10	30	66	109
377	7	19	47	66	139

Commanding General
GLI 83-7405
June 15, 1983
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RESULTS
(Continued)

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
378	10	6	3	<1	19
379	14	8	5	1	28
380	16	9	5	1	31
381	15	9	5	1	30
382	15	9	5	1	30
383	34	12	4	<1	50
384	37	13	4	<1	54
385	35	14	4	<1	53
386	46	17	5	<1	68
387	38	14	4	<1	56
388	16	9	4	<1	29
389	34	16	7	<1	57
390	17	9	4	<1	30
391	17	10	5	<1	32
392	21	12	6	<1	39
393	23	7	2	<1	32
394	NO SAMPLE SUBMITTED				
395	27	8	1	<1	36
396	42	12	2	<1	56
397	26	2	<1	<1	28

Commanding General
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RESULTS
(Continued)

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
398	19	15*	4	<1	38**
399	NO SAMPLE SUBMITTED				
400	24	15*	4	<1	43**
401	20	15*	4	<1	39**
402	22	15*	4	<1	41**

* Represents a probable upper limit on the Bromodichloromethane results. There is interference in this sample set.

** Represents a probable upper limit on the total Trihalomethane result.

NOTE: All results reported in micrograms per liter.
Analysis completed 6/10/83.

Bruce A. Babson
Bruce A. Babson
Laboratory Supervisor

BAB/ab
Customer #92400
cc: Elizabeth Betz

TRIHALOMETHANE SAMPLING

MONTH: May
YEAR: 1983

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Tarawa Terrace	Sampler: [illegible] Date: 27 May 1983	
363	Bldg STT-39A, Water Plant @ 1st Pump	4[illegible]
364	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink	1416
365	Bldg TT-48, TT Elem School II, Men's Head across Office	[illegible]
366	Bldg TT-2453, TT Exchange gas Station's Ladies Room	13[illegible]
367	Bldg TT-35, Sewage Plant's Office Sink	1347
WTP:	Sampler: Date:	
Not Called	Bldg E-23, Sewage Lift Station, Knox Trailer Park	
WTP: Montford Point	Sampler: Date:	
368	Bldg M-178, Water Plant @ Sink faucet	13[illegible]
369	Bldg M-625, Steam Plant, Bathroom Sink	132[illegible]
370	Bldg M-128, Branch Clinic, Men's Head (If close go next door)	1314
371	Bldg M-136, Sewage Plant Sink	[illegible]
372	Bldg M-231, BOQ, 1st floor Men's Head	319
WTP: New River	Sampler: Date:	
373	Bldg AS-110, Water Plant @ Pump	1144
374	Bldg G-520, Career Planner, 2nd floor Men's Room	locked
375	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	1154
376	Bldg 710, Officer's Club Gally Sink	1212
377	Bldg 2800, Boat Marina Men's Room	204
WTP: Holcomb Blvd	Sampler: Date:	
378	Bldg 670, Water Plant @ Pump	1418
379	Bldg 4022, Fire Station, Bathroom Sink	[illegible]
380	Bldg 1915, Golf Course, Men's Locker Room	432
381	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom	[illegible]
382	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink	42

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION		TIME
WTP: Rifle Range	Sampler:	Date:	
383	Bldg RR-85, Water Plant @ Finish Tap		1154
384	Bldg RR-6, Fire House Sink		[illegible]
385	Bldg RR-10, Snack Bar Sink		[illegible]
386	Bldg RR-200, Across from Target Shed		[illegible]
387	Bldg RR-92, Sewage Plant Sink		[illegible]
WTP: Courthouse Bay	Sampler:	Date:	
388	Bldg BB-190, Water Plant @ Faucet		232
389	Bldg BB-7, Mess Hall Sink		
390	Bldg BB-54, Service Club		[illegible]
391	Bldg SBB-204, Sewage Plant Sink		[illegible]
392	Bldg BB-46, Marina Bathroom Sink		[illegible]
WTP: Onslow Beach	Sampler:	Date: 5/23/83	
393	Bldg BA-138, Water Plant		0052
394	Bldg BA-103, Mess Hall	Closed for [illegible]	
395	Campsite #2, Spigot 10(Mainland)		
396	Campsite #1, Spigot 2(Beachside)		0925
397	Bldg SBA-142, Spigot at bottom of Pier		[illegible]
WTP: Hadnot Point	Sampler:	Date:	
398	Bldg20, Water Plant @ Pump		1456
399	Bldg NH-1, Emergency Room Sink		[illegible]
400	Bldg 1202, Men's Room Sink		1515
401	Bldg 65, Quality Control Lab, Room 220 Sink		1514
402	Bldg FC-530, Laundry Room Sink, 1st floor		1455

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September 16, 1983
83-8370

Quality Control Lab, NREAD
Facilities, MCB
Camp Lejeune, NC 28542

Attention: Commanding General

Subject: Analyses of Samples Received 8/29/83

Purchase Order: M93170-3136-1481

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
403*	1	3	4	3	11
404*	2	6	8	6	22
405*	1	2	3	5	11
406*	1	3	4	4	12
407*	1	2	3	4	10
408	2	3	3	<1	8
409	1	<1	<1	<1	1
410	3	3	4	<1	10
411	3	3	3	<1	9
412	2	3	3	<1	8
413	4	9	22	27	62
414	5	15	42	63	125
415	5	15	44	69	133
416	4	12	26	51	93
417	4	14	41	70	129
418	12	7	3	<1	22
419	15	9	5	<1	29
420	16	9	5	<1	30
421	16	9	5	<1	30
422	17	10	5	<1	32

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GLI 83-8370
September 16, 1983
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RESULTS
(Continued)

Sample	Chloroform	Bromodichloromethane	Chlorodibromomethane	Bromoform	Total Trihalomethane
423	29	9	3	<1	41
424	33	11	3	<1	47
425	33	11	3	<1	47
426	40	13	4	<1	57
427	36	12	4	<1	52
428	16	9	5	<1	30
429	17	9	5	<1	31
430	15	8	4	<1	27
431	16	9	5	<1	30
432	29	15	8	<1	52
433	12	2	<1	<1	14
435	40	5	2	<1	47
436	41	10	2	<1	53
437	20	<1	<1	<1	20
438**	21	≤15	2	<1	≤38
439**	27	≤15	2	<1	≤44
440**	22	≤15	2	<1	≤39
441**	22	≤15	2	<1	≤39
442**	23	≤15	3	<1	≤41

* All samples from this site exhibit contamination from Tetrachloroethylene.

** All samples from this site exhibit contamination from both Trichloroethylene and Tetrachloroethylene. The reported values for Bromodichloromethane and Total Trihalomethane are probable upper limits on the concentrations for these parameters.

NOTE: All results reported in micrograms per liter.
Analysis completed 9/8/83.

Bruce A. Babson

Bruce A. Babson
Laboratory Supervisor

BAB/at
cc: Elizabeth Betz

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Tarawa Terrace	Sampler: H: L Date: 8/26/83	
403	Bldg STT-39A, Water Plant @ 1st Pump	0844
404	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink	0836
405	Bldg TT-48, TT Elem School II, Men's Head across Office	0900
406	Bldg TT-2453, TT Exchange gas Station's Ladies Room	0847
407	Bldg TT-35, Sewage Plant's Office Sink	0854
WTP:	Sampler: Date:	
—	Bldg E-23, Sewage Lift Station, Knox Trailer Park	
WTP: Montford Point	Sampler: H.L Date: 8/26/83	
408	Bldg M-178, Water Plant @ Sink faucet	0917
409	Bldg M-625, Steam Plant, Bathroom Sink	0909
410	Bldg M-128, Branch Clinic, Men's Head	0931
411	Bldg M-136, Sewage Plant Sink	0926
412	Bldg M-231, BOQ, 1st floor Men's Head	0921
WTP: New River	Sampler: Date:	
413	Bldg AS-110, Water Plant @ Pump	303
414	Bldg G-520, Career Planner, 2nd floor Men's Room	1257
415	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	1317
416	Bldg 710, Officer's Club Gally Sink	1340
417	Bldg 2800, Boat Marina Men's Room	1330
WTP: Holcomb Blvd	Sampler: L Date: 26-	
418	Bldg 670, Water Plant @ Pump	1412
419	Bldg 4022, Fire Station, Bathroom Sink	[illegible]
420	Bldg 1915, Golf Course, Men's Locker Room	1429
421	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom	1421
422	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink	1437

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION		TIME
WTP: Rifle Range	Sampler: [illegible]	Date: [illegible]	
423	Bldg RR-85, Water Plant @ Finish Tap		
424	Bldg RR-6, Fire House Sink		
425	Bldg RR-10, Snack Bar Sink		
426	Bldg RR-200, Across from Target Shed		
427	Bldg RR-92, Sewage Plant Sink		[illegible]
WTP: Courthouse Bay	Sampler: [illegible]	Date: 5 25 0[illegible]	
428	Bldg BB-190, Water Plant @ Faucet		134[illegible]
429	Bldg BB-7, Mess Hall Sink		351
430	Bldg BB-54, Service Club		1405
431	Bldg SBB-204, Sewage Plant Sink		1357
432	Bldg BB-46, Marina Bathroom Sink		346
WTP: Onslow Beach	Sampler: [illegible]	Date:	
433	Bldg BA-138, Water Plant		[illegible]
434	Bldg BA-103, Mess Hall		
435	Campsite #2, Spigot 10(Mainland)		[illegible]
436	Campsite #1, Spigot 2(Beachside)		[illegible]
437	Bldg SBA-142, Spigot at bottom of Pier		1:21
WTP: Hadnot Point	Sampler: L	Date: 8-26-87	
438	Bldg20, Water Plant @ Pump		14[illegible]
439	Bldg NH-1, Emergency Room Sink		[illegible]
440	Bldg 1202, Men's Room Sink		15.
441	Bldg 65, Quality Control Lab, Room 220 Sink		1 20
442	Bldg FC-530, Laundry Room Sink, 1st floor		[illegible]

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January 18, 1984
84-9479

Quality Control Lab, NREAD
Facilities, MCB
Camp Lejeune, NC 28542

Attention: Ms. Elizabeth Betz

Subject: Analyses of Samples Received 1/3/84

Sample Identification: Purchase Order M67001-83-M5089

1. 443, NR, 1255, 12-29-83
2. 444, NR, 1354, 12-29-83
3. 445, NR, 1304, 12-29-83
4. 446, NR, 1323, 12-29-83
5. 447, NR, 1313, 12-29-83
6. 448, HP, 0830, 12-30-83
7. 449, HP, 0910, 12-30-83
8. 450, HP, 0935, 12-30-83
9. 451, HP, 1010, 12-30-83
10. 452, HP, 0925, 12-30-83

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
1	2	5	14	34	55
2	3	7	20	47	77
3	4	10	31	67	112
4	9	12	34	70	125
5	4	11	38	78	131

Quality Control Lab
GLI 84-9479
January 18, 1984
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RESULTS
(Continued)

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
6	30*	8	4	<1	42**
7	30*	9	4	<1	43**
8	30*	10	4	<1	44**
9	30*	8	4	<1	42**
10	30*	10	4	<1	44**

NOTE: All results reported in micrograms per liter.
Analysis completed 1/12/84.

* Represents a probable upper limit on the chloroform concetration. These is an interferent in this sample set.

** Represents a probable upper limit on the total trihalomethane content.

Bruce A. Babson

Bruce A. Babson
Staff Chemist

BAB/at
Customer #92400

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION			TIME
WTP: Tarawa Terrace	Sampler:		Date:	
	Bldg STT-39A, Water Plant @ 1st Pump			
	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink			
	Bldg TT-48, TT Elem School II, Men's Head across Office			
	Bldg TT-2453, TT Exchange gas Station's Ladies Room			
	Bldg TT-35, Sewage Plant's Office Sink			
WTP:	Sampler:		Date:	
	Bldg E-23, Sewage Lift Station, Knox Trailer Park			
WTP: Montford Point	Sampler:		Date:	
	Bldg M-178, Water Plant @ Sink faucet			
	Bldg M-625, Steam Plant, Bathroom Sink			
	Bldg M-128, Branch Clinic, Men's Head			
	Bldg M-136, Sewage Plant Sink			
	Bldg M-231, BOQ, 1st floor Men's Head			
WTP: New River	Sampler: L 7		Date: 89	
443 A+B	Bldg AS-110, Water Plant @ Pump			
444	Bldg 6-520, Career Planner, 2nd floor Men's Room			1234
445	Bldg AS-4025, Barracks Rec Room, Bathroom Sink			12 4
446	Bldg 710, Officer's Club Gally Sink			23
447	Bldg 2800, Boat Marina Men's Room			1
WTP: Holcomb Blvd	Sampler:		Date:	
	Bldg 670, Water Plant @ Pump			
	Bldg 4022, Fire Station, Bathroom Sink			
	Bldg 1915, Golf Course, Men's Locker Room			
	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom			
	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink			

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE#	SAMPLE LOCATION	TIME
WTP: Rifle Range	Sampler: Date:	
	Bldg RR-85, Water Plant @ Finish Tap	
	Bldg RR-6, Fire House Sink	
	Bldg RR-10, Snack Bar Sink	
	Bldg RR-200, Across from Target Shed	
	Bldg RR-92, Sewage Plant Sink	
WTP: Courthouse Bay	Sampler: Date:	
	Bldg BB-190, Water Plant @ Faucet	
	Bldg BB-7, Mess Hall Sink	
	Bldg BB-54, Service Club	
	Bldg SBB-204, Sewage Plant Sink	
	Bldg BB-46, Marina Bathroom Sink	
WTP: Onslow Beach	Sampler: Date:	
	Bldg BA-138, Water Plant	
	Bldg BA-103, Mess Hall	
	Campsite #2, Spigot 10(Mainland)	
	Campsite #1, Spigot 2(Beachside)	
	Bldg SBA-142, Spigot at bottom of Pier	
WTP: Hadnot Point	Sampler: Date: 12/30/83	
448	Bldg20, Water Plant @ Pump	0830
449	Bldg NH-1, Emergency Room Sink	0910
450	Bldg 1202, Men's Room Sink	0935
451	Bldg 65, Quality Control Lab, Room 220 Sink	1010
452	Bldg FC-530, Laundry Room Sink, 1st floor	0925

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April 9, 1984
84-10434

Quality Control Lab, NREAD
Facilities, MCB
Camp Lejeune, NC 28542

Attention: Ms. Elizabeth Betz

Subject: Analyses of Samples Received 4/2/84

Sample Identification: Purchase Order M67001-83-M-5089

1. #453
2. #454
3. #455
4. #456
5. #457
6. #458

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
1	5	8	19	49	81
2	6	14	35	83	138
3	7	14	38	86	145
4	5	11	31	81	128
5	5	11	32	93	141
6	25*	9	5	<1	39*

NOTE: All results reported in micrograms per liter.
Analysis completed 4/5/84.

* Represents a probable upper limit on the concentration. There is interference in this sample on the chloroform determination.

Bruce A. Babson
Bruce A. Babson
Staff Chemist

BAB/at
Customer #92400

TRIHALOMETHANE SAMPLING

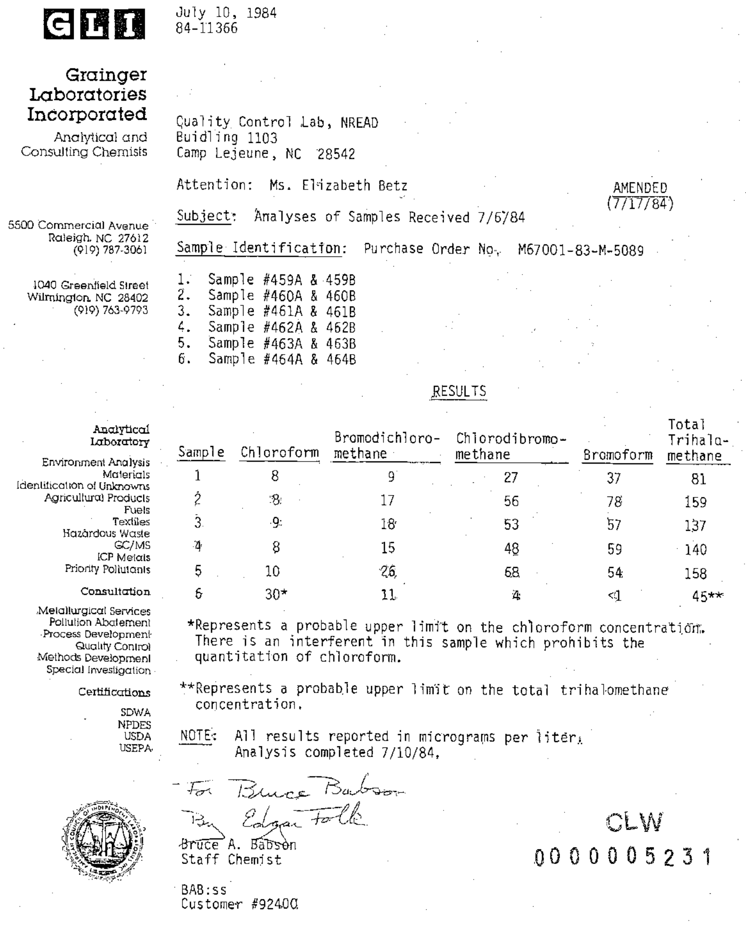
MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Tarawa Terrace	Sampler: Date:	
	Bldg STT-39A, Water Plant @ 1st Pump	
	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink	
	Bldg TT-48, TT Elem School II, Men's Head across Office	
	Bldg TT-2453, TT Exchange gas Station's Ladies Room	
	Bldg TT-35, Sewage Plant's Office Sink	
WTP:	Sampler: Date:	
	Bldg E-23, Sewage Lift Station, Knox Trailer Park	
WTP: Montford Point	Sampler: Date:	
	Bldg M-178, Water Plant @ Sink faucet	
	Bldg M-625, Steam Plant, Bathroom Sink	
	Bldg M-128, Branch Clinic, Men's Head	
	Bldg M-136, Sewage Plant Sink	
	Bldg M-231, BOQ, 1st floor Men's Head	
WTP: New River	Sampler: Date: 3/27/84	
453	Bldg AS-110, Water Plant @ Pump	0952
454	Bldg G-520, Career Planner, 2nd floor Men's Room	1053
455	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	1018
456	Bldg 710, Officer's Club Gally Sink	1037
457	Bldg 2800, Boat Marina Men's Room	1029
WTP: Holcomb Blvd	Sampler: Date:	
	Bldg 670, Water Plant @ Pump	
	Bldg 4022, Fire Station, Bathroom Sink	
	Bldg 1915, Golf Course, Men's Locker Room	
	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom	
	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink	

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION	TIME
WTP: Rifle Range	Sampler: Date:	
	Bldg RR-85, Water Plant @ Finish Tap	
	Bldg RR-6, Fire House Sink	
	Bldg RR-10, Snack Bar Sink	
	Bldg RR-200, Across from Target Shed	
	Bldg RR-92, Sewage Plant Sink	
WTP: Courthouse Bay	Sampler: Date:	
	Bldg BB-190, Water Plant @ Faucet	
	Bldg BB-7, Mess Hall Sink	
	Bldg BB-54, Service Club	
	Bldg SBB-204, Sewage Plant Sink	
	Bldg BB-46, Marina Bathroom Sink	
WTP: Onslow Beach	Sampler: Date:	
	Bldg BA-138, Water Plant	
	Bldg BA-103, Mess Hall	
	Campsite #2, Spigot 10(Mainland)	
	Campsite #1, Spigot 2(Beachside)	
	Bldg SBA-142, Spigot at bottom of Pier	
WTP: Hadnot Point	Sampler: Date: 3-26-84	
	Bldg20, Water Plant @ Pump	
	Bldg NH-1, Emergency Room Sink	
	Bldg 1202, Men's Room Sink	
	Bldg 65, Quality Control Lab, Room 220 Sink	
453	Bldg FC-530, Laundry Room Sink, 1st floor	1339



GLI

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Analytical and Consulting Chemists

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Wilmington, NC 28402
(919) 763-9793

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Hazardous Waste
GC/MS
ICP Metals
Priority Pollutants

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Metallurgical Services
Pollution Abatement
Process Development
Quality Control
Methods Development
Special Investigation

Certifications
SDWA
NPDES
USDA
USEPA

July 10, 1984
84-11366

Quality Control Lab, NREAD
Buidling 1103
Camp Lejeune, NC 28542

Attention: Ms. Elizabeth Betz

AMENDED
(7/17/84)

Subject: Analyses of Samples Received 7/6/84

Sample Identification: Purchase Order No. M67001-83-M-5089

1. Sample #459A & 459B
2. Sample #460A & 460B
3. Sample #461A & 461B
4. Sample #462A & 462B
5. Sample #463A & 463B
6. Sample #464A & 464B

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
1	8	9	27	37	81
2	8	17	56	78	159
3	9	18	53	57	137
4	8	15	48	59	140
5	10	26	68	54	158
6	30*	11	4	<1	45**

*Represents a probable upper limit on the chloroform concentration. There is an interferent in this sample which prohibits the quantitation of chloroform.

**Represents a probable upper limit on the total trihalomethane concentration.

NOTE: All results reported in micrograms per liter. Analysis completed 7/10/84.

For Bruce Babson
By Edgar Folk
Bruce A. Babson
Staff Chemist

BAB:ss
Customer #92400

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION		TIME
WTP: Tarawa Terrace	Sampler:	Date:	
	Bldg STT-39A, Water Plant @ 1st Pump		
	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink		
	Bldg TT-48, TT Elem School II, Men's Head across Office		
	Bldg TT-2453, TT Exchange gas Station's Ladies Room		
	Bldg TT-35, Sewage Plant's Office Sink		
WTP:	Sampler:	Date:	
	Bldg E-23, Sewage Lift Station, Knox Trailer Park		
WTP: Montford Point	Sampler:	Date:	
	Bldg M-178, Water Plant @ Sink faucet		
	Bldg M-625, Steam Plant, Bathroom Sink		
	Bldg M-128, Branch Clinic, Men's Head		
	Bldg M-136, Sewage Plant Sink		
	Bldg M-231, BOQ, 1st floor Men's Head		
WTP: New River	Sampler:	Date:	
459	Bldg AS-110, Water Plant @ Pump	6/27/84	1240
460	Bldg G-520, Career Planner, 2nd floor Men's Room	6/27/84	1231
461	Bldg AS-4025, Barracks Rec Room, Bathroom Sink	6/27/84	1250
462	Bldg 710, Officer's Club Gally Sink	6/27/84	1311
463	Bldg 2800, Boat Marina Men's Room	6/27/84	1301
WTP: Holcomb Blvd	Sampler:	Date:	
	Bldg 670, Water Plant @ Pump		
	Bldg 4022, Fire Station, Bathroom Sink		
	Bldg 1915, Golf Course, Men's Locker Room		
	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom		
	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink		

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION			TIME
WTP: Rifle Range	Sampler: Date:			
	Bldg RR-85, Water Plant @ Finish Tap			
	Bldg RR-6, Fire House Sink			
	Bldg RR-10, Snack Bar Sink			
	Bldg RR-200, Across from Target Shed			
	Bldg RR-92, Sewage Plant Sink			
WTP: Courthouse Bay	Sampler: Date:			
	Bldg BB-190, Water Plant @ Faucet			
	Bldg BB-7, Mess Hall Sink			
	Bldg BB-54, Service Club			
	Bldg SBB-204, Sewage Plant Sink			
	Bldg BB-46, Marina Bathroom Sink			
WTP: Onslow Beach	Sampler: Date:			
	Bldg BA-138, Water Plant			
	Bldg BA-103, Mess Hall			
	Campsite #2, Spigot 10(Mainland)			
	Campsite #1, Spigot 2(Beachside)			
	Bldg SBA-142, Spigot at bottom of Pier			
WTP: Hadnot Point	Sampler: Date:			
	Bldg20, Water Plant @ Pump			
	Bldg NH-1, Emergency Room Sink			
	Bldg 1202, Men's Room Sink			
	Bldg 65, Quality Control Lab, Room 220 Sink			
464	Bldg FC-530, Laundry Room Sink, 1st floor	27,	67	14-

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ICP Metals
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Consultation

Metallurgical Services
Pollution Abatement
Process Development
Quality Control
Methods Development
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USEPA

October 3, 1984
84-12017

Quality Control Lab, NREAD
Facilities, MCB
Camp Lejeune, NC 28542

Attention: Commanding General

Subject: Analysis of Samples Received 9-28-84

Sample Identification: Purchase Order No. M67001-83M-5089

1. #465, NR, 1023, 9-21-84
2. #466, NR, 0952, 9-21-84
3. #467, NR, 1030, 9-21-84
4. #468, NR, 1059, 9-21-84
5. #469, NR, 1044, 9-21-84
6. #470, HP, 1430, 9-21-84

RESULTS

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
1	3	7	22	50	82
2	3	9	37	105	154
3	3	9	35	79	126
4	3	10	41	100	154
5	2	9	39	136	186
*5	2	9	39	136	186
6	17	9	4	<1	30

*Represents duplicate analysis

NOTE: All results reported in micrograms per liter.
Analysis completed 10-2-84.

Edgar E. Folk III

Edgar E. Folk
Staff Chemist

EEF:sb
cc: Ms. Elizabeth Betz

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION		TIME
WTP: Tarawa Terrace	Sampler:	Date:	
	Bldg STT-39A, Water Plant @ 1st Pump		
	Bldg TT-60, TT Elem School I, Main Hall Men's Head Sink		
	Bldg TT-48, TT Elem School II, Men's Head across Office		
	Bldg TT-2453, TT Exchange gas Station's Ladies Room		
	Bldg TT-35, Sewage Plant's Office Sink		
WTP:	Sampler:	Date:	
	Bldg E-23, Sewage Lift Station, Knox Trailer Park		
WTP: Montford Point	Sampler:	Date:	
	Bldg M-178, Water Plant @ Sink faucet		
	Bldg M-625, Steam Plant, Bathroom Sink		
	Bldg M-128, Branch Clinic, Men's Head		
	Bldg M-136, Sewage Plant Sink		
	Bldg M-231, BOQ, 1st floor Men's Head		
WTP: New River	Sampler: H, B	Date: 9/21/84	
765	Bldg AS-110, Water Plant @ Pump		1023
766	Bldg C-520, Career Planner, 2nd floor Men's Room		0952
767	Bldg AS-4025, Barracks Rec Room, Bathroom Sink		1030
[illegible]	Bldg 710, Officer's Club Gally Sink		~~10~~ 1059
764	Bldg 2800, Boat Marina Men's Room		1044
WTP: Holcomb Blvd	Sampler:	Date:	
	Bldg 670, Water Plant @ Pump		
	Bldg 4022, Fire Station, Bathroom Sink		
	Bldg 1915, Golf Course, Men's Locker Room		
	Bldg 5400, Berkeley Manor Elem School, Main Hall Bathroom		
	Bldg 2615, PP Officer's Club, Gally Dishwashing Sink		

TRIHALOMETHANE SAMPLING

MONTH:
YEAR:

SAMPLE #	SAMPLE LOCATION		TIME
WTP:	Rifle Range Sampler:	Date:	
	Bldg RR-85, Water Plant @ Finish Tap		
	Bldg RR-6, Fire House Sink		
	Bldg RR-10, Snack Bar Sink		
	Bldg RR-200, Across from Target Shed		
	Bldg RR-92, Sewage Plant Sink		
WTP:	Courthouse Bay Sampler:	Date:	
	Bldg BB-190, Water Plant @ Faucet		
	Bldg BB-7, Mess Hall Sink		
	Bldg BB-54, Service Club		
	Bldg SBB-204, Sewage Plant Sink		
	Bldg BB-46, Marina Bathroom Sink		
WTP:	Onslow Beach Sampler:	Date:	
	Bldg BA-138, Water Plant		
	Bldg BA-103, Mess Hall		
	Campsite #2, Spigot 10(Mainland)		
	Campsite #1, Spigot 2(Beachside)		
	Bldg SBA-142, Spigot at bottom of Pier		
WTP:	Hadnot Point Sampler: H:B	Date: 9/21/84	
	Bldg20, Water Plant @ Pump		
	Bldg NH-1, Emergency Room Sink		
	Bldg 1202, Men's Room Sink		
	Bldg 65, Quality Control Lab, Room 220 Sink		
970	Bldg FC-530, Laundry Room Sink, 1st floor	1430	

0152

216/144A (Rev. 8-81)
0107-LF-052-2320

DEPARTMENT OF THE NAVY
Memorandum

DATE: 21 December 1982

FROM: Ms. Betz, Qeality Control Lab., Environmental Section, NREAD

TO: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAD

SUBJ: Trihalomethane Analysis for November 1982

1. Enclosed is a summary of the November Trihalomethane analysis. The Air Station is still right on the border. The rest of the systems are well within compliance.

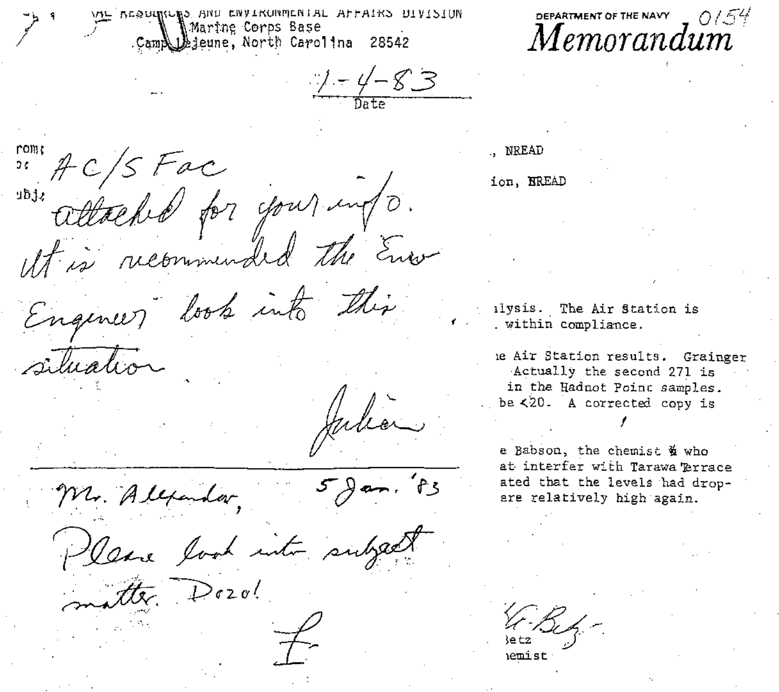
2. There were two typos in the results. One typo was in the Air Station results. Grainger accidently duplicated the sample number 271 but not results. Actually the second 271 is 272, 272 is 273, 273 is 274, 274 is 275. The other typo was in the Hadnot Point samples. The <30 under Bromodichloromethane for #300 should actually be <20. A corrected copy is on its way.

3. When I called Grainger about the error, I talked to Bruce Babson, the chemist who runs our samples. He expressed concern over the solvents that interfer with Tarawa Terrace and Hadnot Point samples, particularly Hadnot Points. He stated that the levels had dropped for a while. However in these last samples the levels were relatively high again.

Elizabeth A. Betz
Elizabeth A. Betz
Supervisory Chemist

Summary of Trihalomethane Analysis for November 1982

Sample #'s	System	Averages					
		Nov.	Sep-Nov	Jun-Aug	Mar-May	Run.Ave.(3 Qtr)	Comply
261-265	Tarawa Terrace	0.01	0.01	0.02	0.01	0.01	yes
266-270	Camp Johnson	0.01	0.01	0.01	0.01	0.01	yes
271-275	New River	0.12	0.10	0.12	0.09	0.10	yes
276-280	Holcomb Blvd	0.03	0.03	0.03	0.04	0.03	yes
281-285	Rifle Range	0.05	0.05	0.06	0.05	0.05	yes
286-290	Courthouse Bay	0.05	0.05	0.05	0.05	0.05	yes
291-295	Onslow Beach	0.04	0.04	0.06	0.05	0.05	yes
296-300	Hadnot Point	0.05	0.05	0.03	0.04	0.04	yes



AL RESOURCES AND ENVIRONMENTAL AFFAIRS DIVISION
Marine Corps Base
Camp Lejeune, North Carolina 28542

DEPARTMENT OF THE NAVY 0154
Memorandum

1-4-83
Date

rom:
o: AC/S Fac
ubj:

attached for your info.
It is recommended the Env
Engineer look into this
situation

Julian

, NREAD

ion, NREAD

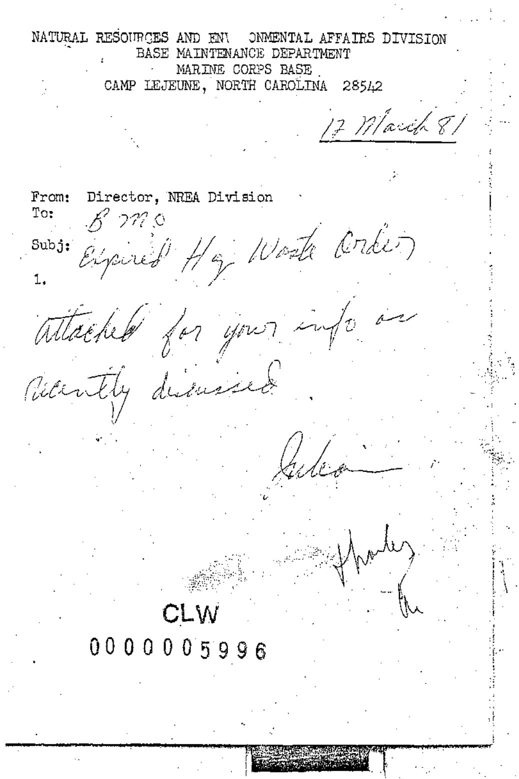
lysis. The Air Station is
. within compliance.

e Air Station results. Grainger
Actually the second 271 is
in the Hadnot Point samples.
be <20. A corrected copy is

e Babson, the chemist who
at interfer with Tarawa Terrace
ated that the levels had drop-
ere relatively high again.

Mr. Alexander, 5 Jan. '83
Please look into subject
matter. Dozol

Betz
emist

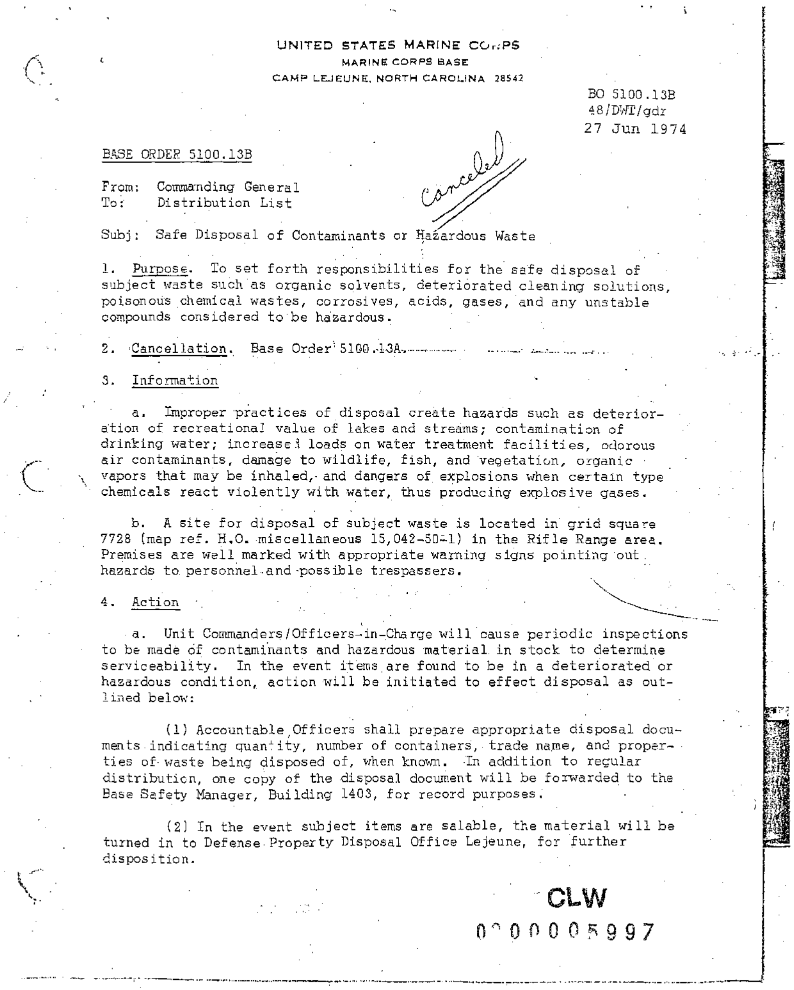


NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS DIVISION
BASE MAINTENANCE DEPARTMENT
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542

17 March 81

From: Director, NREA Division
To: B M O
Subj: Expired Haz Waste Order

1. attached for your info as recently discussed.



UNITED STATES MARINE CORPS
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542

BO 5100.13B
48/DWT/gdr
27 Jun 1974

BASE ORDER 5100.13B

Canceled

From: Commanding General
To: Distribution List

Subj: Safe Disposal of Contaminants or Hazardous Waste

1. Purpose. To set forth responsibilities for the safe disposal of subject waste such as organic solvents, deteriorated cleaning solutions, poisonous chemical wastes, corrosives, acids, gases, and any unstable compounds considered to be hazardous.

2. Cancellation. Base Order 5100.13A.

3. Information

a. Improper practices of disposal create hazards such as deterioration of recreational value of lakes and streams; contamination of drinking water; increased loads on water treatment facilities, odorous air contaminants, damage to wildlife, fish, and vegetation, organic vapors that may be inhaled, and dangers of explosions when certain type chemicals react violently with water, thus producing explosive gases.

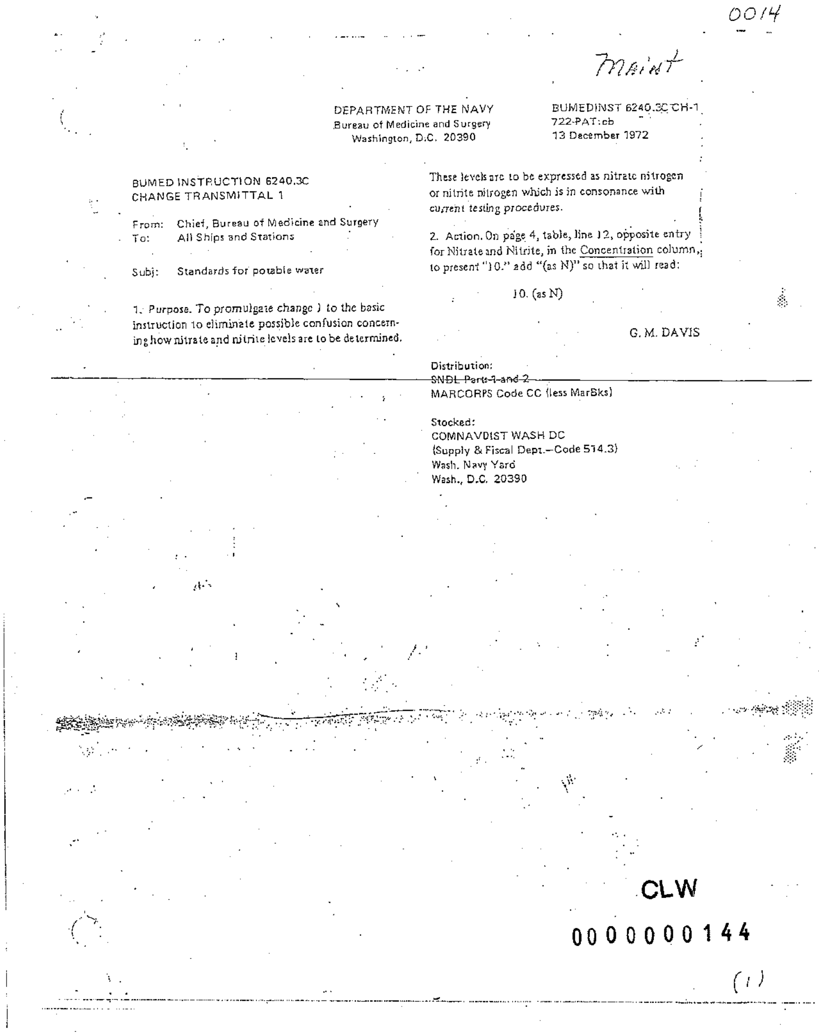
b. A site for disposal of subject waste is located in grid square 7728 (map ref. H.O. miscellaneous 15,042-50-1) in the Rifle Range area. Premises are well marked with appropriate warning signs pointing out hazards to personnel and possible trespassers.

4. Action

a. Unit Commanders/Officers-in-Charge will cause periodic inspections to be made of contaminants and hazardous material in stock to determine serviceability. In the event items are found to be in a deteriorated or hazardous condition, action will be initiated to effect disposal as outlined below:

(1) Accountable Officers shall prepare appropriate disposal documents indicating quantity, number of containers, trade name, and properties of waste being disposed of, when known. In addition to regular distribution, one copy of the disposal document will be forwarded to the Base Safety Manager, Building 1403, for record purposes.

(2) In the event subject items are salable, the material will be turned in to Defense Property Disposal Office Lejeune, for further disposition.



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Maint

DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington, D.C. 20390

BUMEDINST 6240.3C CH-1
722-PAT:cb
13 December 1972

BUMED INSTRUCTION 6240.3C
CHANGE TRANSMITTAL 1

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Standards for potable water

1. Purpose. To promulgate change 1 to the basic instruction to eliminate possible confusion concerning how nitrate and nitrite levels are to be determined. These levels are to be expressed as nitrate nitrogen or nitrite nitrogen which is in consonance with current testing procedures.

2. Action. On page 4, table, line 12, opposite entry for Nitrate and Nitrite, in the Concentration column, to present "10." add "(as N)" so that it will read:

10. (as N)

G. M. DAVIS

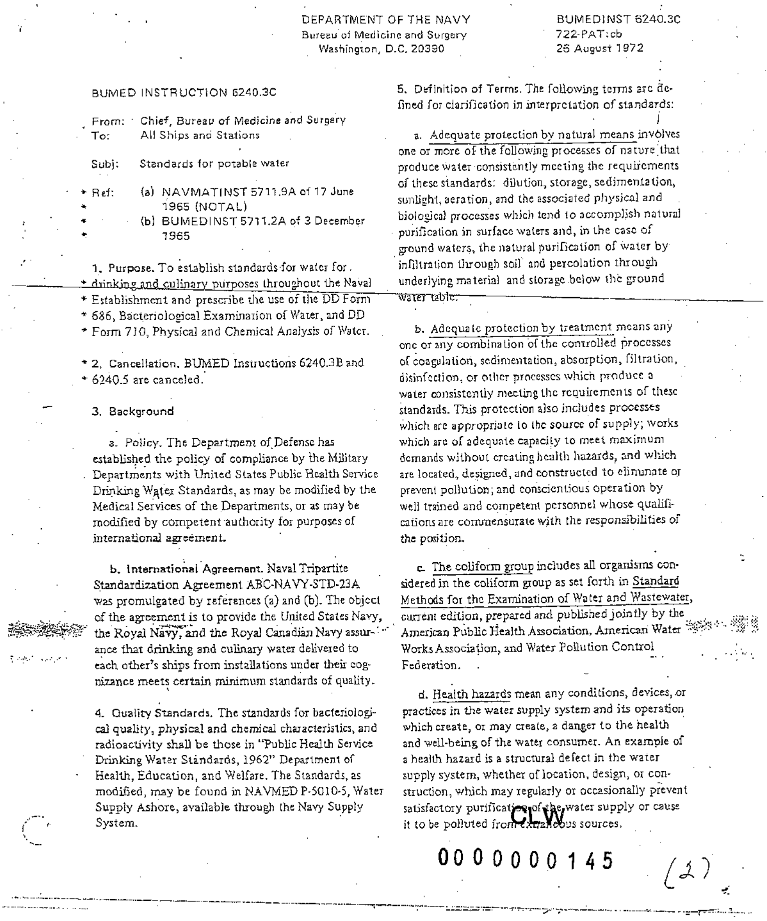
Distribution:
~~SNDL Parts 1 and 2~~
MARCORPS Code CC (less MarBks)

Stocked:
COMNAVDIST WASH DC
(Supply & Fiscal Dept.—Code 514.3)
Wash. Navy Yard
Wash., D.C. 20390

CLW

0000000144

(1)



DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington, D.C. 20390

BUMEDINST 6240.3C
722-PAT:cb
25 August 1972

BUMED INSTRUCTION 6240.3C

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Standards for potable water

* Ref: (a) NAVMATINST 5711.9A of 17 June
* 1965 (NOTAL)
* (b) BUMEDINST 5711.2A of 3 December
* 1965

1. Purpose. To establish standards for water for
* drinking and culinary purposes throughout the Naval
* Establishment and prescribe the use of the DD Form
* 686, Bacteriological Examination of Water, and DD
* Form 710, Physical and Chemical Analysis of Water.

* 2. Cancellation. BUMED Instructions 6240.3B and
* 6240.5 are canceled.

3. Background

a. Policy. The Department of Defense has established the policy of compliance by the Military Departments with United States Public Health Service Drinking Water Standards, as may be modified by the Medical Services of the Departments, or as may be modified by competent authority for purposes of international agreement.

b. International Agreement. Naval Tripartite Standardization Agreement ABC-NAVY-STD-23A was promulgated by references (a) and (b). The object of the agreement is to provide the United States Navy, the Royal Navy, and the Royal Canadian Navy assurance that drinking and culinary water delivered to each other's ships from installations under their cognizance meets certain minimum standards of quality.

4. Quality Standards. The standards for bacteriological quality, physical and chemical characteristics, and radioactivity shall be those in "Public Health Service Drinking Water Standards, 1962" Department of Health, Education, and Welfare. The Standards, as modified, may be found in NAVMED P-5010-5, Water Supply Ashore, available through the Navy Supply System.

5. Definition of Terms. The following terms are defined for clarification in interpretation of standards:

a. Adequate protection by natural means involves one or more of the following processes of nature that produce water consistently meeting the requirements of these standards: dilution, storage, sedimentation, sunlight, aeration, and the associated physical and biological processes which tend to accomplish natural purification in surface waters and, in the case of ground waters, the natural purification of water by infiltration through soil and percolation through underlying material and storage below the ground water table.

b. Adequate protection by treatment means any one or any combination of the controlled processes of coagulation, sedimentation, absorption, filtration, disinfection, or other processes which produce a water consistently meeting the requirements of these standards. This protection also includes processes which are appropriate to the source of supply; works which are of adequate capacity to meet maximum demands without creating health hazards, and which are located, designed, and constructed to eliminate or prevent pollution; and conscientious operation by well trained and competent personnel whose qualifications are commensurate with the responsibilities of the position.

c. The coliform group includes all organisms considered in the coliform group as set forth in Standard Methods for the Examination of Water and Wastewater, current edition, prepared and published jointly by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation.

d. Health hazards mean any conditions, devices, or practices in the water supply system and its operation which create, or may create, a danger to the health and well-being of the water consumer. An example of a health hazard is a structural defect in the water supply system, whether of location, design, or construction, which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources.

CLW

(2)

e. Pollution, as used in these standards, means the presence of any foreign substance (organic, inorganic, radiological, or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water.

f. The standard sample for the bacteriological test shall consist of:

(1) For the bacteriological fermentation tube test, five standard portions of either:

(a) 10 milliliters
(b) 100 milliliters

(2) For the membrane filter technique, not less than 50 milliliters.

g. Water supply system includes the works and auxiliaries for collection, treatment, storage, and distribution of the water from the sources of supply to the freeflowing outlet of the ultimate consumer.

6. Source and Protection

a. The water supply should be obtained from the most desirable source which is feasible, and effort should be made to prevent or control pollution of the source. If the source is not adequately protected by natural means, the supply shall be adequately protected by treatment.

b. Frequent sanitary surveys shall be made of the water supply system to locate and identify health hazards which might exist in the system.

c. Approval of water supplies shall be dependent in part upon:

(1) Enforcement of rules and regulations to prevent development of health hazards;

(2) Adequate protection of the water quality throughout all parts of the system, as demonstrated by frequent surveys;

(3) Proper operation of the water supply system under the responsible charge of personnel whose qualifications are acceptable to the Navy Facilities Engineering Command or Navy Ship Systems Command.

(4) Adequate capacity to meet peak demands without development of low pressures or other health hazards; and

(5) Record of laboratory examinations showing consistent compliance with the water quality requirements of these standards.

7. Standards. The limits listed below are generally those contained in Public Health Service Drinking Water Standards, 1962. For sampling procedures and techniques, refer to NAVMED P-5010-5.

a. Bacteriological Quality (Limits). The presence of organisms of the coliform group as indicated by samples examined shall not exceed the following limits:

(1) When 10 ml. standard portions are examined, not more than 10 percent in any month shall show the presence of the coliform group. The presence of the coliform group in three or more 10 ml. portions of a standard sample shall not be allowable if this occurs:

(a) In two consecutive samples;
(b) In more than one sample per month when less than 20 are examined per month; or
(c) In more than five percent of the samples when 20 or more are examined per month.

When organisms of the coliform group occur in three or more of the 10 ml. portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(2) When 100 ml. standard portions are examined, not more than 60 percent in any month shall show the presence of the coliform group. The presence

of the coliform group in all five of the 100 ml. portions of a standard sample shall not be allowable if this occurs:

(a) In two consecutive samples;
(b) In more than one sample per month when less than five are examined per month; or
(c) In more than 20 percent of the samples when five or more are examined per month.

When organisms of the coliform group occur in all five of the 100 ml. portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(3) When the membrane filter technique is used, the arithmetic mean coliform density of all standard samples examined per month shall not exceed one per 100 ml. Coliform colonies per standard sample shall not exceed 3/50 ml., 4/100 ml., 7/200 ml., or 13/500 ml. in:

(a) Two consecutive samples;
(b) More than one standard sample when less than 20 are examined per month; or
(c) More than five percent of the standard samples when 20 or more are examined per month.

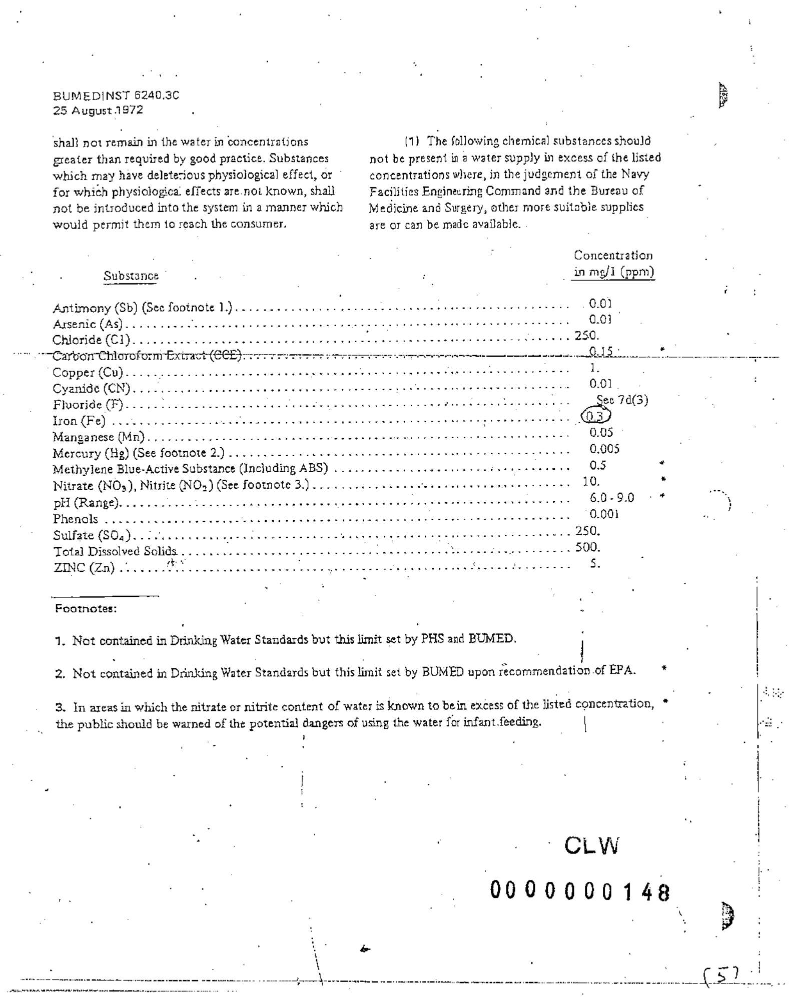
When coliform colonies in a single standard sample exceed the above values, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

b. Bacteriological Examination of Water. Bacteriological Examination of Water, DD Form 686, shall be used by all naval facilities, both ashore and afloat, to conduct bacteriological examination of water.

c. Physical Characteristics (Limits). Drinking water should contain no impurity which would cause offense to the sense of sight, taste, or smell. Under general use, the following limits should not be exceeded:

Turbidity	5 units
Color	15 units
Threshold Odor Number	3

d. Chemical Characteristics (Limits). Drinking water shall not contain impurities in concentrations which may be hazardous to the health of the consumers. It should not be excessively corrosive to the water supply system. Substances used in its treatment



BUMEDINST 6240.3C
25 August 1972

shall not remain in the water in concentrations greater than required by good practice. Substances which may have deleterious physiological effect, or for which physiological effects are not known, shall not be introduced into the system in a manner which would permit them to reach the consumer.

(1) The following chemical substances should not be present in a water supply in excess of the listed concentrations where, in the judgement of the Navy Facilities Engineering Command and the Bureau of Medicine and Surgery, other more suitable supplies are or can be made available.

Substance	Concentration in mg/l (ppm)	
Antimony (Sb) (See footnote 1.)	0.01	
Arsenic (As)	0.01	
Chloride (Cl)	250.	
~~Carbon Chloroform Extract (CCE)~~	~~0.15~~	*
Copper (Cu)	1.	
Cyanide (CN)	0.01	
Fluoride (F)	See 7d(3)	
Iron (Fe)	0.3	
Manganese (Mn)	0.05	
Mercury (Hg) (See footnote 2.)	0.005	
Methylene Blue-Active Substance (Including ABS)	0.5	*
Nitrate (NO_3), Nitrite (NO_2) (See footnote 3.)	10.	*
pH (Range)	6.0 - 9.0	*
Phenols	0.001	
Sulfate (SO_4)	250.	
Total Dissolved Solids	500.	
ZINC (Zn)	5.	

Footnotes:

1. Not contained in Drinking Water Standards but this limit set by PHS and BUMED.

2. Not contained in Drinking Water Standards but this limit set by BUMED upon recommendation of EPA. *

3. In areas in which the nitrate or nitrite content of water is known to be in excess of the listed concentration, the public should be warned of the potential dangers of using the water for infant feeding. *

(5)

(2) The presence of the following substances in excess of the concentrations listed shall constitute grounds for rejection of the supply:

Substance	Concentration in mg/1 (ppm)
Antimony (Sb) (See footnote 1.)	0.05
Arsenic (As)	0.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Chromium (Hexavalent) (Cr^{+6})	0.05
Cyanide (CN)	0.2
Fluoride (F)	See 7d(3)
Lead (Pb)	0.05
Pesticides, Herbacides, Fungicides (See footnote 2.)	
Chlorinated hydrocarbons	0.003 - 0.1
Organo-phosphates	0.1
Chlorophenoxy herbacides	0.005 - 1.00
Selenium (Se)	0.01
Silver (Ag)	0.05

Footnotes:

1. Not contained in Drinking Water Standards but this limit set by PHS and BUMED.

2. Concentrations represent range of levels for each group of chemicals. Individual pesticides have specific concentrations - queries should be directed to BUMED (Code 72).

(3) Fluoride. When fluoride is naturally present in drinking water, the concentration should not average more than the appropriate upper limit in the following table. Presence of fluoride in average concentrations greater than two times the optimum values in the table shall constitute grounds for rejection of the supply. When fluoridation (supplementation of fluoride in drinking water) is practiced, the average fluoride concentration shall be kept within the upper and lower control limits in the table.

Annual average of maximum daily air temperatures, based on data obtained for a minimum of 5 years	Recommended control limits-Fluoride concentrations in mg/1 (ppm).		
	Lower	Optimum	Upper
50.0 - 53.7	0.9	1.2	1.7
53.8 - 58.3	0.8	1.1	1.5
58.4 - 63.8	0.8	1.0	1.3
63.9 - 70.6	0.7	0.9	1.2
70.7 - 79.2	0.7	0.8	1.0
79.3 - 90.5	0.6	0.7	0.8

e. Physical and Chemical Analysis of Water. Physical and Chemical Analysis of Water, DD Form 710, shall be used by all naval facilities, both ashore and afloat, to conduct physical and chemical analysis of water.

CLW

(6)

f. Radioactivity (Limits).

(1) The effects of human radiation exposure are viewed as harmful and any unnecessary exposure to ionizing radiation should be avoided. Approval of water supplies containing radioactive materials shall be based upon the judgement that the radioactivity intake from such water supplies when added to that from all other sources is not likely to result in an intake greater than the radiation protection guidance recommended by the Federal Radiation Council and approved by the President. (The Federal Radiation Council, in its 13 September 1961, Memorandum for the President, recommended that "Routine control of useful applications of radiation and atomic energy should be such that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II (20 $\mu\mu c$/day of Radium-226 and 200 $\mu\mu c$/day of Strontium-90).") Water supplies shall be approved without further consideration of other sources of radioactivity intake of Radium-226 and Strontium-90 when the water contains these substances in amounts not exceeding 3 and 10 $\mu\mu c$/liter, respectively. When these concentrations are exceeded, a water supply shall be approved by the certifying authority if surveillance of total intakes of radioactivity from all sources indicates that such intakes are within the limits recommended by the Federal Radiation Council for control action.

(2) In the known absence (taken here to mean a negligibly small fraction of the above specific limits, where the limit for unidentified alpha emitters is taken as the listed limit for Radium-226) of Strontium-90 and alpha emitters, the water supply is acceptable when the gross beta concentrations do not exceed 1,000 $\mu\mu c$/liter. Gross beta concentrations in excess of 1,000 $\mu\mu c$/liter shall be grounds for rejection of supply except when more complete analyses indicate that concentrations of nuclides are not likely to cause exposures greater than the Radiation Protection Guides as approved by the President on recommendation of the Federal Radiation Council.

8. Technical Assistance. Assistance with potable water problems may be requested from the following:

a. Environmental and Preventive Medicine Units, in accordance with BUMED Instruction 6200.3C series, Subj: Environmental and Preventive Medicine Units.

b. Navy Facilities Engineering Command's Field Engineering Offices in accordance with current NAVFAC Instruction 5450.19 series, Subj: Sanitary Engineering Responsibilities of the Naval Facilities Engineering Command Field Division.

9. Procurement of DD Form 686 and DD Form 710. DD Form 686, Bacteriological Examination of Water, and DD Form 710, Physical and Chemical Analysis of Water, mav be obtained from Cognizance I stock points of the Navy Supply System.

G. M. DAVIS

Distribution:
SNDL Parts 1 and 2
MARCORPS Code CC (less MarBks)

Stocked:
COMNAVDIST WASH DC
(Supply & Fiscal Dept.—Code 514.3)
Wash. Navy Yard
Wash., D.C. 20390

(7)

GRAINGER LABORATORIES, INC.
LETTER OF AUGUST 10, 1982

ALSO ATTACHED ARE

MEMORANDUM FOR THE RECORDS WRITTEN BY SUPERVISORY CHEMIST
DATED MAY 25, 1982 AND JULY 30, 1982

MEMORANDUM WRITTEN BY SUPVY CHEMIST TO SUPVY ECOLOGIST
DATED AUGUST 19, 1982

GRAINGER LABORATORIES
INCORPORATED
ANALYTICAL AND CONSULTING CHEMISTS
709 West Johnson Street • Raleigh, North Carolina 27603
(919) 828-3360

ANALYTICAL LABORATORY
Environment Analysis
Construction Materials
Identification of Unknowns
Agriculture
Fuels
Textiles
Chemicals
Hazardous Waste

CONSULTATION
Metallurgical Service
Pollution Abatement
Process Development
Quality Control
Methods Development
Special Investigations
Pesticides
RCRA

August 10, 1982
82-4471

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Discussion:

Previously all samples from site TT and HP presented difficulties in performing the monthly Trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejuene personnel.

Results:

The identity of the contaminant in the well field represented by samples 206 and 207 was suspected to be Tetrachloroethylene. This was confirmed by two analytical techniques and the results were 76 μg/l and 82 μg/l for samples 206 and 207 respectively.. Sample 86 from May 27, 1982 was reanalyzed as a part of our study. Sample 86 was from site TT and contained 80 μg/l tetrachloroethylene.

Samples 208 and 209 were also analyzed by the same analytical techniques. The magnitude of the contamination was not as great as previously observed from this same sampling point. Upon reanalyzing sample 120 from site HP May 27, 1982 , Trichloroethylene was identified and quantitated at 1400 μg/l. A lesser amount of Tetrachloroethylene was confirmed at 15 μg/l. Samples 208 and 209 contained 19 μg/l and 21 μg/l Trichloroethylene respectively; Tetrachloroethylene was not detected.

Camp Lejuene
GLI 82-4471
August 10, 1982
Page 2

Prior to this report, the samples from July 28, 1982 from site HP were analyzed. Traces of both solvents were found in this set. Though not quantitated, the level of Trichloroethylene seems to be in the range of that which was found in samples 208 and 209. The sample which showed the most contamination relative to the others was 205. Also sample 168 from site TT on July 28, 1982 was analyzed and shown to contain 104 μg/l Tetrachloroethylene.

Conclusion:

Tetrachloroethylene was identified as the contaminant in the well field coded "TT". Its concentration seems relatively stable over the period in which it has been examined. It was confirmed that the well field coded "HP" has shown contamination by Trichloroethylene and Tetrachloroethylene. These levels have been variable over the per studied and are now at significantly lower levels than when first encountered. The following table summarizes the findings:

Sample	Date Taken	Site Code	Tri chloroethylene	Tetra-chloroethylene
206	7-27-82	TT	-	76
207	7-27-82	TT	-	82
86	5-27-82	TT	-	80
168	7-28-82	TT	-	104
208	7-27-82	HP	19	<1
209	7-27-82	HP	21	<1
120	5-27-82	HP	1400	15
205	7-28-82	HP	No Data	1.0

Bruce A. Babson
Bruce A. Babson
Chemist

BAB/ab
Customer #92400

Date: 25 May 1982

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

Subj: Phone Conversation with Mike Hargett on 6 May 1982

1. On 6 May 1982, Mike Hargett, of Grainger Labs called to say that during the analysis of April's 1982 samples they had some interferences. He said that peaks for Perclene and Trichloroethylene (TCE), which are synthetic organic cleaning solvents were found in samples #001-005 (Tarawa Terrace Water System) and #037-041 (Hadnot Point Water System). He also stated that the TCE peak for the Hadnot Point samples overlapped the Bromodichloromethane peak. He asked if a less than value would be accepteable since that is all that could be read. I stated that that would be fine. He also stated that no mention would be made of the extra peaks except for the less than value on the report.

2. Right after I talked with Mike Hargett, I notified Danny Sharpe, Supervisory Ecologist, of Grainger's findings. The findings were then sent up the chain of command to Billy Elston, Deputy Base Maintenance Officer, and over to the Utilities Director, Fred Cone.

3. Later on 6 May 1982, I called Mike Hargett back to discuss cost of analysis. Analysis would cost $75 for both parameters per sample.

4. On 14 May 1982, while briefing Col Millice and LtCol Fritzgerald on April's trihalomethane analysis, it appeared to me that they had not been informed about the findings. I didn't inform them.

Elizabeth A. Betz
Supervisory Chemist

Date: 30 July 1982

Memorandum for the Record

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

Subj: Raw and Treated Sampling at Tarawa Terrace and Hadnot Point Water Treatment Plants

1. On 28 July 1982, Gaines Huneycutt and Elizabeth Betz collected a raw and a treated water sample at the Water Treatment Plants for Hadnot Point and Tarawa Terrace. The reason for the sampling was that during the analysis of the Base's THM samples by Grainger Labs, Grainger had come accross some interferring peaks cause by the presence of trichloroethylene and perclene(synthetic organic cleaning solvents) in the samples from Tarawa Terrace and Hadnot Point.

2. Below is listed the sample numbers and locations of the samples.

Sample #	Location	Time
206 A&B	TT WTP, Bldg STT-38, Raw	1000
207 A&B	TT WTP, Bldg STT-39A, Treated	1005
208 A&B	HP WTP, Bldg 20(Man-hole)Raw	1055
209 A&B	HP WTP, Bldg 20, Treated	1100

3. The sample containers had arrived in an ice chest from Grainger. Mike Hargett had instructed that the samples had to be sent back to Grainger by bus and on ice since the solvents were highly volatile. A DD1348/1 was prepared by Mr. Richardson of Base Maintenance Property Office. At approximately 1130, the samples were carried to Freight Traffic, who had arranged to take them to the bus station for the 1400 bus to Raleigh. Mike Hargett was called and notified to have someone pick up the samples at approximately 1730 at the Raleigh bus station.

4. During a phone conversation with Mike Hargett on 30 July 1982, it was learned that the samples had been received.

Elizabeth A. Betz

Elizabeth A. Betz
Supervisory Chemist

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

1. On 6 May 1982, Mike Hargett, of Grainger Labs, called and informed me that on 3 May 1982, while they were analyzing the first set of Trihalomethane samples received from us, interferences possibly from chlorinated hydrocarbons hindered analysis of samples from two systems, Tarawa Terrace and Hadnot Point.

2. It was determined that raw and treated samples from the treatment plants for the two systems would be taken for analysis of the interferring chlorinated hydrocarbons. On 28 July 1982, a raw water sample, #206, and a treated water sample, #207, were taken at the Tarawa Terrace water treatment plant. A raw water sample, #208, and a treated water sample, #209, were taken at the Hadnot Point water treatment plant, on 28 July 1982. The Trihalomethane samples for July were also taken on 28 July 1982, for these two systems. In Grainger's letter, of 10 August 1982, they erroneous report the samplessas taken on 27 July 1982, they were collected and shipped on 28 July 1982.

3. Analysis of the above samples and some Grainger had preserved showed that in the Tarawa Terrace water treatment plant and system, the interferring chlorinated hydrocarbon is tetrachloroethylene, or otherwise known as perchloroethylene. Tetrachloroethylene is used as a dry cleaning and degreasing solvent, and heat-transfer medium, Analysis of the Hadnot Point water treatment plant and system samples showed Trichloroethylene and low levels of tetrachloroethylene. Trichloroethylene is used primarily as a metal degreaser. It is also used as a dry-cleaning solvent and a type of pesticide, fumigant.

4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

5. Tetrachloroethylene, in high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for tetrachloroethylene are 2300 ug/1 for 1-day, 175 ug/1 for 10-days, and 20 ug/1 for longer-term where drinking water is the only source of exposure. On 9 April 1980, EPA came out with a Suggested Action Guidance on Tetrachloroethylene. This guidance was a result of possible tetrachloroethylene contamination of drinking water

where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/l (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/l (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/l.

6. Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethanes), at high levels , has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for trichloroethylene were determined to be 2 mg/l for 1-day, 0.2 mg/l for 10-day, and 75 ug/l for a chronic snarl. There is no Suggested Action Guidance on trichloroethylene.

7. Below is a table of the results received from Grainger labs.

Sample #	Sample Date	WTP	Sample Site	_chloroethylene, ug/l	
				Tri-	Tetra-
86 168	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data	100
208	7-28082	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

8. The level of tetrachloroethylene for the Tarawa Terrace system samples averaged 0.09 mg/l, which exceeded the recommended level of 0.04 mg/l. The levels do not vary significantly between the raw and treated samples. The raw and treated samp ples were taken at the plant where the water had already traveled some distance in pipes. Therefore, with no significant difference between raw and treated samples and the high average of 0.09 mg/l, I would believe the tetrachloroethylene contamination is possibly do to the use of coated A/C pipe in the raw water lines at Tarawa Terrace.. Tetrachloroethylene, in the Hadnot Point system samples is at trace levels and well under recommended levels.

9. The level of trichloroethylene, at Hadnot Point, is presently averaging 20 ug/l, which is below all three recommended snarls; 1-day, 10-day, and chronic. No explaination is offered for the 1400 ug/l level on 27 May 1982, or why it is now averaging only 20 ug/l.

Elizabeth A. Betz
Supervisory Chemist

APR 9 1980

Suggested Action Guidance - Tetrachloroethylene
Criteria and Standards Division
Office of Drinking Water
U.S. Environmental Protection Agency
Washington, D.C. 20460

The Office of Drinking Water, Criteria and Standards Division, recommends the following actions related to drinking water contamination from coated A/C pipe based upon its earlier document entitled "SNARL for tetrachloroethylene (February 6, 1980). This suggested action guidance should not imply that EPA condones the presence of any level of this contaminant in drinking water, but rather provides useful information to assist in the setting of control priorities in those cases where tetrachloroethylene has been found so as to minimize possible risks from exposure from drinking water.

Our recommendations for this situation include: (1) immediate remedial action (within 24 hours) if the drinking water concentration of tetrachloroethylene is found to exceed 2.3 mg/l (equivalent to our 1-day SNARL), and (2) remedial action within 10 days if the tetrachloroethylene concentration exceeds 0.13 mg/l (equivalent to our 10-day SNARL). Furthermore, the priority and timeliness of remedial actions should be proportional to the exposure level. For extended exposures, we recommend, in addition, that the drinking water supplies should be maintained at no more than 0.04 mg/l for any extended period. That concentration, if consumed over a lifetime at 2 l/day would, by a conservative estimation process, have an associated excess cancer risk of approximately one per 100,000. Thus, an additional safety margin is included since the source of this present exposure would be transient and variable, not lifetime. In light of the limited precision for estimating concentrations which may result in a particular computed risk and appreciating the variability in water concentrations over time, the 0.04 mg/l concentration is essentially equivalent to our longer-term SNARL of 0.02 mg/l where a margin of safety was incorporated to protect the 10 kg child from non-carcinogenic, adverse health effects from long term exposure.

In the derivation of the tetrachloroethylene SNARL, and of this suggested action guidance, it has been assumed that drinking water is the sole source of the exposure of an individual to this particular contaminant. In actuality, however, any individual is exposed to most substances via a variety of routes including air, food and drinking water. Even though the relative exposure from each source is location dependent, it was estimated that a 10 kg child would be exposed on the average across the U.S. to 0.04 mg TCE/day with 94 percent, 4 percent, and $\leq$ 1 percent coming from air drinking water and food, respectively. We assume that the rate of absorption through the gastrointestinal tract for food and water is nearly 100 percent and that the rate of absorption via inhalation is approximately 30 percent. Further consideration should also be given to the fact that the amount of tetrachloroethylene exposure from air would be much higher for people working in dry-cleaning and metal degreasing industries. With the exception of occupational exposure to tetrachloroethylene, then, the body burden from non-impacted environmental sources and the associated background levels due to normal releases of tetrachloroethylene nationally are roughly equivalent to the longer-term SNARL of 0.02 mg/l or the suggested guidance of 0.04 mg/l (rounded from the 35 ug/l SNARL). The suggested guidance would then pose, a risk which is essentially equivalent to that experienced from exposure to the national background levels.

NREAD/EAB

Charles E. Rundgren, Head
Water Supply Branch
Division of Health Services
P. O. Box 2091
Raleigh, NC 27602-2091

Dear Mr. Rundgren:

Enclosed are tables of results of Inorganic Chemical and Corrosivity analysis conducted in the past year, for all eight water treatment plants aboard Marine Corps Base, Camp Lejeune, as required by the Safe Drinking Water Act. Also enclosed isaa table showing the construction materials used in our distribution systems.

The laboratory analysis was run by Grainger Laboratories, Inc in Raleigh, NC. The field analysis(temperature and pH) was run by personnel in the Quality Control Laboratory located in the Natural Resources and Environmental Affairs Division, Assistant Chief of Staff Facilities. Ms. Elizabeth Betz, Supervisory Chemicst, Quality Control Laboratory, telephone (919)451-5977 is the point of contact in this matter.

Encl

Copy to:
LANTDIV(COde 114)
BMD, Util Dir
Supvy Chem

INORGANIC CHEMICAL RESULTS (mg/1) FOR SERIAL NO. 04-67-041 thru 048

Parameter	Method	Containment Code	041	042	043	044	045	046	047	048
Arsenic	123	1005	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Barium	101	1010	0.01	0.04	0.03	0.01	0.04	0.04	0.01	0.01
Cadmium	101	1015	0.0011	0.0005	0.0005	0.0005	0.0005	0.0005	0.0011	0.0005
Chromium	101	1020	0.003	0.003	0.003	0.003	0.017	0.004	0.003	0.003
Fluoride	107	1025	0.994	0.24	0.856	1.00	0.139	0.126	0.109	0.146
Lead	101	1030	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Mercury	103	1035	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Nitrate (N)	109	1040	0.17	0.05	0.11	0.05	0.05	0.05	0.11	0.05
Selenium	123	1045	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Silver	101	1050	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Iron	101	1028	0.045	0.338	0.037	0.020	0.673	0.544	0.536	0.556
Manganese	101	1032	0.002	0.004	0.002	0.006	0.015	0.030	0.011	0.025
Sodium	101	1052	20.7	79.8	24.4	19.8	81.9	88.7	81.5	66.4

All Samples Collected (Except Sodium): 29 September 1982
Sodium Samples Collected: 3 September 1982

All Results Run by Grainger Laboratories (ID# 37709)

ENCLOSURE (1)

CORROSIVITY RESULTS FOR SERIAL NO. 04-67-041 thru 048

PARAMETER	METHOD	CONTAMINANT CODE	041	042	043	044	045	046	047	048
pH	135	1925	8.8	7.6	8.2	8.2	7.1	8.0	7.9	7.1
Temperature °c	130	1996	20.0	20.0	19.0	20.0	20.0	23.0	21.0	21.0
Total Alkalinity As $CACO_3$ mg/1	142	1927	51.9	136	82.3	76.4	166	151	164	155
Total Filterable Residue mg/1	139	1930	106	320	10	152	126	230	246	140
Calcium As $CACO_3$ mg/1	101	1919	40.9	48.0	56.1	101	41.9	44.3	50.0	111
Stability Index (Langelier)	140	1910	0.25	-0.59	0.03	0.19	-0.95	0.06	-0.12	-0.54

All samples collected: 3 September 1982

pH & temperature run by Quality Control Laboratory (ID #37807)

The rest of the results run by Grainger Lab (ID #37709)

ENCLOSURE (2)

CONSTRUCTION MATERIALS SYSTEM SERIAL NO. 04-67-041 thru 048 (See Note 1)

MATERIAL	041	042	043	044	045	046	047	048
Lead from piping, solder, caulking, interior lining of distribution mains, alloys and home plumbing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Copper from piping and alloys, service lines and home plumbing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Galvanized piping, service lines and home plumbing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ferrous piping materials such as cast iron and steel	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asbestoes cement pipe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vinyl lined asbestoes cement pipe	No	No	No	No	No	No	No	No
Coal tar lined pipes and tanks	No	No	No	No	No	No	No	No
Other: PVC	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Information obtained from:
Water Treatment Section,
Utilities Branch
and
Outside Plumbing Section,
General Trades,
Maintenance & Repair Branch,
Base Maintenance Division

ENCLOSURE (3).

INORGANIC CHEMICAL RESULTS (mg/l) for
Results mg/l
Serial No. 04-67- [illegible]

Parameter	Method	Contaminant Code	041	042	083	044	045	046	047	048
Arsenic	123	1005	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Barium	101	1010	0.01	0.04	0.03	0.01	0.04	0.04	0.01	0.01
Cadmium	101	1015	0.0011	0.0005	0.0005	0.0005	0.0005	0.0007	0.0011	0.0005
Chromium	101	1020	0.003	0.003	0.003	0.003	0.017	0.004	0.003	0.003
Fluoride	107	1025	0.994	0.24	0.856	1.00	0.139	0.126	0.109	0.146
Lead	101	1030	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Mercury	103	1035	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Nitrate(N)	109	1040	0.17	0.05	0.11	0.05	0.05	0.05	0.11	0.05
Selenium	123	1045	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Silver	101	1050	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001
Iron	101	1028	0.045	0.338	0.037	0.020	0.673	0.544	0.536	0.556
Manganese	101	1032	0.002	0.004	0.002	0.006	0.015	0.030	0.011	0.025
~~Sodium~~	101	1052	20.7	79.8	24.4	19.8	81.9	88.7	81.5	66.4

All Samples Collected(Except Sodium): 29 September 1982
Sodium Samples Collected: 3 September 1982

All Results run by Grainger Laboratories(ID#37709)

ACIS FAC 8125

MAIN/JIW/bb
11100.1
25 Aug 1982

From: Commanding General
To: Officer-in-Charge, Naval Energy and Environmental Support Activity,
Port Hueneme, California 93043

Subj: Draft Initial Assessment Study of Marine Corps Base, Camp Lejeune; comments on

Ref: (a) OIC NESSA ltr 112N:WSE:def 11100/1:273A Ser 1209 of 5 Aug 1982

Encl: (1) Draft Initial Assessment Study of the Marine Corps Base, Camp Lejeune, North Carolina

1. The enclosure has been reviewed as requested by the reference and the following comments are provided and changes recommended:

a. Paragraph 2.27. Presence of large amounts of unexploded ordnance in impact zones and adjacent buffer zones; this comment is of questionable validity.

b. Section 2.3, page 2-3, Second paragraph. Recommend that last sentence be deleted in that lack of controls over and records of hazardous materials/waste disposal prior to 1970 precluded such a conclusion.

c. Section 2.3, page 2-5, First paragraph. Burning of solvents in fire training pits is currently prohibited and no evidence exists to suggest solvents presently burned.

d. Section 2.4.1, page 2-6, Second sentence should read as follows: It is on Coastal Carolina Community College property that was excessed by Camp Lejeune.

e. Paragraph 2.4.3. Recommend deleting "The area where DDT . . . . . radius of the dump marker." Also, change "buried" to "discharged" intthird sentence.

f. Paragraph 2.4.3 and page 4-12. The materials observed on the surface have been properly removed and disposed of at the Base Sanitary Landfill.

g. Paragraph 2.4.12. Recommend deleting "sewage treatment" from site identification nomenclature.

MAIN/JIW/bb
11100.1

Subj: Draft Initial Assessment study of Marine Corps Base, Camp Lejeune;
comments on

h. Paragraphs 2.4.1&page 2-18. Discussion of trihalomethane (TTHM) content of Rifle Range on the page 2-18 and extensive data shown on pages 6-12, 6-13, 6-14, 6-15, 6-17 and 6-18 overly stresses relationship with hazardous material/waste disposal. It is important to note that accuracy of data provided by U.S. Army laboratory is questionable. It is recommended that TTHM information be de-emphasized throughout the report.

i. Paragraph 3.4.12 delete "sewage treatment plant" from site identification nomenclature.

j. Paragraph 2.4.2 and pages 4-8, 4-9 and 6-19. It is recommended that the two DDT mixing areas which have been noted on page E-2 be incorporated into this site. As a result of recent publicity regarding DDT contamination at Bldg 712, a former employee brought these sites to the attention of Base Health and Environmental officials.

k. Page 5-30. The American Alligator is routinely observed at Camp Lejeune on New River and numerous tributaries as well as marshes along the Intracoastal Waterway.

l. Page 6-26, Figure 6-1. Burning of solid waste was discontinued base-wide when present base sanitary landfill opened in 1972.

m. Page 6-27. Recommend changing last sentence of fourth paragraph to read "Storage Lot 140 and Bldg TP-451 are currently designated as long term hazardous waste storage areas."

2. In that confirmation of the 20 sites identified in the enclosure will be an extensive endeavor, it is foreseen that availability of funding will require confirmation to be accomplished in increments. Therefore, it is recommended that the 20 sites be prioritized.

J. T. MARSHALL
By direction

DEPARTMENT OF THE NAVY
NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY
PORT HUENEME, CALIFORNIA 93043

IN REPLY REFER TO:
112N:WSE:seh
11100/1:273A
Ser 1209
5 AUG 1982

From: Officer in Charge
To: Distribution

Subj: Draft Initial Assessment Study of the Marine Corps Base,
Camp Lejeune, North Carolina

Ref: (a) OPNAVNOTE 6240 Ser 45/733503 of 11 Sep 80
(b) MARCORPS Order 6280.1 of 30 Jan 81
(c) CNO ltr ser 451/33503 of 11 Sep 80
(d) NEESA ltr 112N/WSE/pm ser 1754 of 18 Dec 81

Encl: (1) Draft Initial Assessment Study of the Marine Corps Base, Camp Lejeune, North Carolina

1. The Navy Assessment and Control of Installation Pollutants (NACIP) program, reference (a) and (b), provides for identification, assessment, and control of environmental contamination from past storage, use, and disposal of chemicals and hazardous materials at Navy and Marine Corps activities. Under the NACIP program, the Naval Energy and Environmental Support Activity (NEESA), in coordination with an Engineering Field Division (EFD) of the Naval Facilities Engineering Command, conducts an Initial Assessment Study at an activity to ascertain the potential for contamination of the environment. An Initial Assessment Study for the Marine Corps Base, Camp Lejeune, North Carolina, was approved by CNO via reference (c) and initiated by NEESA notification in reference (d).

2. The Draft Initial Assessment Study of the Marine Corps Base, enclosure (1), prepared by Water and Air Research, Inc., of Gainesville Florida, is forwarded for your review and comment. The Draft Initial Assessment Study should be reviewed for completeness, accuracy, and concurrence with the recommendations contained therein. For inclusion in the final report, comments and concurrence are requested no later than 25 August 1982, attention Code 112N.

112N:WSE:seh
11100/1:273A
Ser. 1209
5 AUG 1982

3. Questions and comments concerning the Draft Initial Assessment Study should be referred to Wallace Eakes, Contract Coordinator, NEESA Code 112N, A/V 360-3351, FTS 799-3351 or (805) 982-3351. Your cooperation in this study is greatly appreciated.

Wallace Eakes
WALLACE S. EAKES
By direction

Distribution:
CMC (LFF-2) (2 cys)
CG MCB Camp Lejeune
COMNAVFACENGCOM (112) (2 cys)
LANTNAVFACENGCOM (114) (3 cys)

Copy to:
MCB Camp Lejeune (BMO/NREAD) (2 cys ea)
MCAS H New River NC (S-4) (2 cys)

01.01-12/01/82-02059

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ROUTINE

R 142120Z DEC 82

FM NAVENENVSA PORT HUENEME CA

TO CG MCB CAMP LEJEUNE NC

INFO CMC WASHINGTON DC COMNAVFACENGCOM ALEXANDRIA VA
LANTNAVFACENGCOM NORFOLK VA

UNCLAS //N11100//

SUBJ: INITIAL ASSESSMENT STUDY OF MCB CAMP LEJEUNE

A. YOUR 081901Z DEC 82

1. CMC FOR LFF-2/HUBBEL; COMNAVFACENGCOM FOR 1121B/PAULIUKONIS; LANTNAVFACENGCOM FOR 1143/WALLMEYER. AS REQUESTED BY A, THE INITAL ASSESSMENT STUDY (IAS) FOR MCB CAMP LEJEUNE IS BEING EXTENDED AND MODIFIED TO INVESTIGATE NEW INFORMATION CONCERNING TWO DISPOSAL SITES. THE CONTRACTOR CONDUCTING THE IAS, WATER AND AIR RESEARCH \R) IS BEING ISSUED A CHANGE ORDER TO INCLUDE A VISIT TO THE DIS-SAL SITES IN QUESTION, INTERVIEWS WITH INDIVIDUALS IDENTIFIED CONCERNING DISPOSAL AT THESE SITES, AND TO INCORPORATE THE NEW INFORMATION INTO THE FINAL EDITION OF THE IAS.

2. UPON COMPLETION OF THE CHANGE ORDER, WALLACE EAKES, NAVENENVSA, CODE 112N, WILL CONTACT LANTNAVFACENGCOM AND MCB CAMP LEJEUNE TO PLAN AND COORDINATE ADDITIONAL INVESTIGATION. IT IS ANTICIPATED THAT FINAL REPORT, INCLUDING NEW INFORMATION, WILL BE PUBLISHED IN ABOUT FOUR MONTHS AFTER CHANGE ORDER IS ISSUED.

3. POINT OF CONTACT IN THIS MATTER IS W. EAKES, NAVENENVSA, CODE 112N, A/V 360-3351.

BT

DLVR:LANTNAVFACENGCOM NORFOLK VA(14)...INFO

RTD:000-000/COPIES:0014

273815/350 1 OF 1 MATA0029 350/00:08Z 142120Z DEC 82
CSN:AUIA00037 NAVENENVSA POR

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DEPARTMENT OF THE NAVY FACILITIES ENGINEERING COMMAND

Do Not
Take
From
Office

APRIL 1983

INITIAL ASSESSMENT STUDY OF MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA

NEESA 13–011

NAVAL ENERGY AND ENVIRONMENTAL
SUPPORT ACTIVITY
Port Hueneme, California 93043

RELEASE OF THIS DOCUMENT REQUIRES PRIOR NOTIFICATION

INITIAL ASSESSMENT STUDY
OF MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA

UIC-M67001

Prepared for:

NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY

Prepared by:

WATER AND AIR RESEARCH, INC.
Gainesville, Florida

Dr. Hugh Putnam, Team Leader, Report Author, Biologist
Mr. James Nichols, P.E., Environmental Engineer
Mr. Michael Hein, Environmental Scientist
Mr. William Adams, Hydrogeologist
Mr. Charles Fellows, Environmental Chemist
Dr. Jerry Steinberg, P.E. Environmental Engineer

April, 1983

EXECUTIVE SUMMARY

This report presents the results of an Initial Assessment Study (IAS) conducted at Marine Corps Base (MCB) Camp Lejeune and outlying fields. The purpose of an IAS is to identify and assess sites posing a potential threat to human health or the environment due to contamination from past hazardous materials operations.

Based on information from historical records, aerial photographs, field inspections, and personnel interviews, a total of 76 potentially contaminated sites were identified. Each of the sites was evaluated with regard to contamination characteristics, migration pathways, and pollutant receptors.

The study concludes that, while none of the sites pose an immediate threat to human health or the environment, 22 warrant further investigation under the Navy Assessment and Control of Installation Pollutants (NACIP) Program, to assess potential long-term impacts. A confirmation study, involving actual sampling and monitoring of the 22 sites, is recommended to confirm or deny the existence of the suspected contamination and to quantify the extent of any problems which may exist. Since the on-site survey, MCB Camp Lejeune has taken action to evaluate or mitigate Site No. 2, the Former Nursery/Day-Care Center, and Site No. 16, the Montford Point Burn Dump. The 22 sites recommended for confirmation are listed below in order of priority.

1. Rifle Range Chemical Dump, Site No. 69;
2. Storage Lots 201 and 203, Site No. 6;
3. MCAS Mercury Dumpsite, Site No. 48;
4. Former Nursery/Day-Care Center, Site No. 2;
5. Transformer Storage Lot 140, Site No. 21;
6. Camp Geiger Dump, Site No. 41;
7. Mess Hall Grease Disposal Area, Site No. 74;
8. MCAS Basketball Court Site, Site No. 75;
9. MCAS Curtis Road Site, Site No. 76;
10. Courthouse Bay Liquids Disposal Area, Site No. 73;
11. Fire Fighting Training Pit, Site No. 9;
12. Industrial Area Fly Ash Dump, Site No. 24;
13. Campbell Street Underground Avgas Storage and Adjacent JP Fuel Farm at Air Station, Site No. 45;
14. Hadnot Point Burn Dump, Site No. 28;
15. French Creek Liquids Disposal Area, Site No. 1;
16. Rifle Range Dump, Site No. 68;
17. Montford Point Burn Dump, Site No. 16 (Mitigation undertaken);
18. Industrial Area Tank Farm, Site No. 22;
19. Crash Crew Fire Training Burn Pit; Site No. 54;
20. Sneads Ferry Road--Fuel Tank Sludge Area, Site No. 30;
21. Camp Geiger Area Dump, Site No. 36;
22. Camp Geiger Area Fuel Farm, Site No. 35.

The results of the Confirmation Study will be used to evaluate the necessity of conducting mitigating actions or clean-up operations.

3.4 SITES REQUIRING FURTHER ASSESSMENT.

3.4.1 Site No. 1: French Creek Liquids Disposal Area. Waste POL and used battery acid may threaten a potable water well at Building 636. Potential also exists for pollutant migration off-site into Cogdels Creek and then into the New River. Hence, adverse public health and/or environmental impacts are possible.

3.4.2 Site No. 2: Former Nursery/Day-Care Center. Residual pesticides may exist in soils and drainage conveyance sediments. Potential exists for movement to potable groundwater and Overs Creek. Therefore, adverse public health and/or environmental impacts are possible.

3.4.3 Site No. 6: Storage Lots 201 and 203. Residual from past disposal and spills of DDT may be present in great enough amounts to move off-site to surface waters (Wallace and Bearhead Creeks) and impact the aquatic environment.

3.4.4 Site No. 9: Fire Fighting Training Pit at Piney Green Road. Residual POL from fire fighting training potentially threatens surface waters (Bearhead Creek) with possible adverse health and/or environmental impacts.

3.4.5 Site No. 16: Montford Point Burn Dump, Site A. Asbestos on the ground poses a public health threat to persons being exposed to it. (Note: Mitigation has been undertaken.)

3.4.6. Site No. 21: Transformer Storage Lot 140. Transformer oil, possibly containing PCBs, may have seeped into the groundwater table and may be migrating toward potable water wells. Residual pesticides in the soil and in the drainage ditch sediment may threaten human health by direct contact. Migration potential to Bearhead Creek exists, hence, adverse public health and/or environmental impacts are possible.

3.4.7 Site No. 22: Industrial Area Tank Farm. Fuel leakage may have produced residual contamination of soils with potential for movement to potable groundwater (e.g., Well No. 602).

3.4.8 Site No. 24: Industrial Area Fly Ash Dump. Past disposal of fly ash and solvents may result in migration of harmful substances to Cogdels Creek with adverse public health and/or environmental impacts.

3.4.9 Site No. 28: Hadnot Point Burn Dump. Residuals from past industrial waste disposal potentially threatens Cogdels Creek, the New River, and a recreation pond with adverse health and environmental impacts.

3.4.10 Site No. 30: Sneads Ferry Road--Fuel Tank Sludge Area. Sludge deposits from fuel storage may leach hazardous fuel additives. Subsequent migration to French Creek could result in environmental degradation.

Site No.: 22

Name: Industrial Area Tank Farm

Location: PWDM Coordinates 10, J15; east of intersection of Cribb Road and Ash Street.

Figures and Photos: 2-1, 6-3, 6-12, 6-13a

Size: Area estimated at 3.5 to 4 acres.

Previously Reported: No

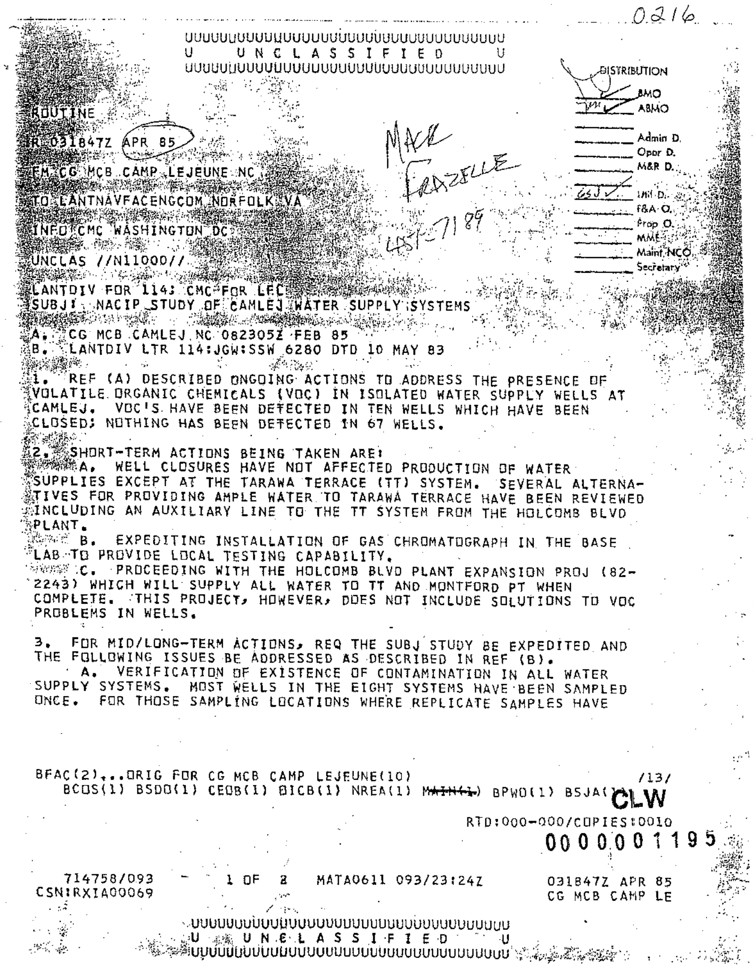
Activity: Site is a fuel storage and dispensing area for vehicles. Leakage has occurred from fuel lines.

Materials Involved: Diesel, unleaded and possibly leaded gasoline

Quantity: 20,000 to 50,000 gallons from an underground line near the tank truck loading facility

When: 1979

Comments: Fuel farm installed in 1940s. There have been problems with leaks. The latest was a 100-gallon leak of diesel fuel in 1981. In 1979, a fuel leak of an estimated 20,000 to 30,000 gallons occurred. The leak was in an underground line slightly to the rear of the tank truck loading facility and between the building and the large aboveground fuel tank. Fuel has been lost through pinhole leaks in the underground lines. There is no evidence of extensive corrosion in the system. Control is maintained by an established fuel audit system.



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Prop O.
MME
Maint NCO
Secretary

MACK FRAZELLE
451-7189

ROUTINE

R 031847Z APR 85

FM CG MCB CAMP LEJEUNE NC

TO LANTNAVFACENGCOM NORFOLK VA

INFO CMC WASHINGTON DC

UNCLAS //N11000//

LANTDIV FOR 114; CMC FOR LFC
SUBJ: NACIP STUDY OF CAMLEJ WATER SUPPLY SYSTEMS

A. CG MCB CAMLEJ NC 082305Z FEB 85
B. LANTDIV LTR 114:JGW:SSW 6280 DTD 10 MAY 83

1. REF (A) DESCRIBED ONGOING ACTIONS TO ADDRESS THE PRESENCE OF VOLATILE ORGANIC CHEMICALS (VOC) IN ISOLATED WATER SUPPLY WELLS AT CAMLEJ. VOC'S HAVE BEEN DETECTED IN TEN WELLS WHICH HAVE BEEN CLOSED; NOTHING HAS BEEN DETECTED IN 67 WELLS.

2. SHORT-TERM ACTIONS BEING TAKEN ARE:

A. WELL CLOSURES HAVE NOT AFFECTED PRODUCTION OF WATER SUPPLIES EXCEPT AT THE TARAWA TERRACE (TT) SYSTEM. SEVERAL ALTERNATIVES FOR PROVIDING AMPLE WATER TO TARAWA TERRACE HAVE BEEN REVIEWED INCLUDING AN AUXILIARY LINE TO THE TT SYSTEM FROM THE HOLCOMB BLVD PLANT.

B. EXPEDITING INSTALLATION OF GAS CHROMATOGRAPH IN THE BASE LAB TO PROVIDE LOCAL TESTING CAPABILITY.

C. PROCEEDING WITH THE HOLCOMB BLVD PLANT EXPANSION PROJ (82-2243) WHICH WILL SUPPLY ALL WATER TO TT AND MONTFORD PT WHEN COMPLETE. THIS PROJECT, HOWEVER, DOES NOT INCLUDE SOLUTIONS TO VOC PROBLEMS IN WELLS.

3. FOR MID/LONG-TERM ACTIONS, REQ THE SUBJ STUDY BE EXPEDITED AND THE FOLLOWING ISSUES BE ADDRESSED AS DESCRIBED IN REF (B).

A. VERIFICATION OF EXISTENCE OF CONTAMINATION IN ALL WATER SUPPLY SYSTEMS. MOST WELLS IN THE EIGHT SYSTEMS HAVE BEEN SAMPLED ONCE. FOR THOSE SAMPLING LOCATIONS WHERE REPLICATE SAMPLES HAVE

BFAC(2)...ORIG FOR CG MCB CAMP LEJEUNE(10) /13/
BCOS(1) BSDO(1) CEOB(1) BICB(1) NREA(1) ~~MAIN(1)~~ BPWO(1) BSJA(1) CLW

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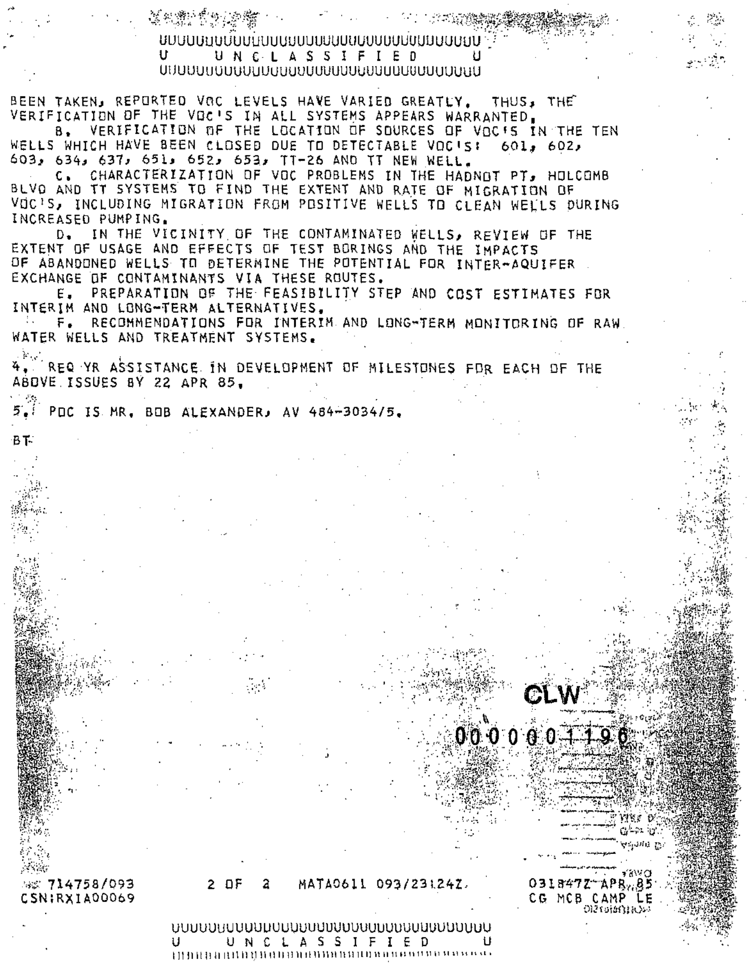

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BEEN TAKEN, REPORTED VOC LEVELS HAVE VARIED GREATLY. THUS, THE VERIFICATION OF THE VOC'S IN ALL SYSTEMS APPEARS WARRANTED.

B. VERIFICATION OF THE LOCATION OF SOURCES OF VOC'S IN THE TEN WELLS WHICH HAVE BEEN CLOSED DUE TO DETECTABLE VOC'S: 601, 602, 603, 634, 637, 651, 652, 653, TT-26 AND TT NEW WELL.

C. CHARACTERIZATION OF VOC PROBLEMS IN THE HADNOT PT, HOLCOMB BLVD AND TT SYSTEMS TO FIND THE EXTENT AND RATE OF MIGRATION OF VOC'S, INCLUDING MIGRATION FROM POSITIVE WELLS TO CLEAN WELLS DURING INCREASED PUMPING.

D. IN THE VICINITY OF THE CONTAMINATED WELLS, REVIEW OF THE EXTENT OF USAGE AND EFFECTS OF TEST BORINGS AND THE IMPACTS OF ABANDONED WELLS TO DETERMINE THE POTENTIAL FOR INTER-AQUIFER EXCHANGE OF CONTAMINANTS VIA THESE ROUTES.

E. PREPARATION OF THE FEASIBILITY STEP AND COST ESTIMATES FOR INTERIM AND LONG-TERM ALTERNATIVES.

F. RECOMMENDATIONS FOR INTERIM AND LONG-TERM MONITORING OF RAW WATER WELLS AND TREATMENT SYSTEMS.

4. REQ YR ASSISTANCE IN DEVELOPMENT OF MILESTONES FOR EACH OF THE ABOVE ISSUES BY 22 APR 85.

5. POC IS MR. BOB ALEXANDER, AV 484-3034/5.

BT

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714758/093 2 OF 2 MATA0611 093/23124Z 031847Z APR 85
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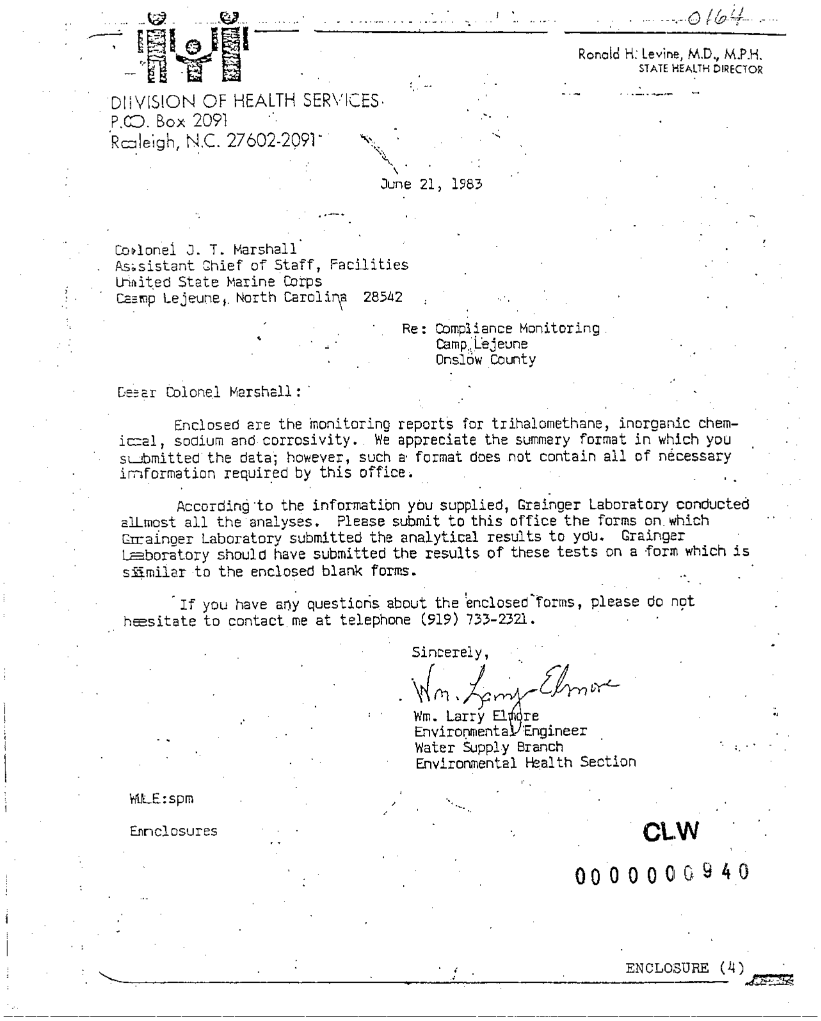

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DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

June 21, 1983

Colonel J. T. Marshall
Assistant Chief of Staff, Facilities
United State Marine Corps
Camp Lejeune, North Carolina 28542

Re: Compliance Monitoring
Camp Lejeune
Onslow County

Dear Colonel Marshall:

Enclosed are the monitoring reports for trihalomethane, inorganic chemical, sodium and corrosivity. We appreciate the summary format in which you submitted the data; however, such a format does not contain all of necessary information required by this office.

According to the information you supplied, Grainger Laboratory conducted almost all the analyses. Please submit to this office the forms on which Grainger Laboratory submitted the analytical results to you. Grainger Laboratory should have submitted the results of these tests on a form which is similar to the enclosed blank forms.

If you have any questions about the enclosed forms, please do not hesitate to contact me at telephone (919) 733-2321.

Sincerely,

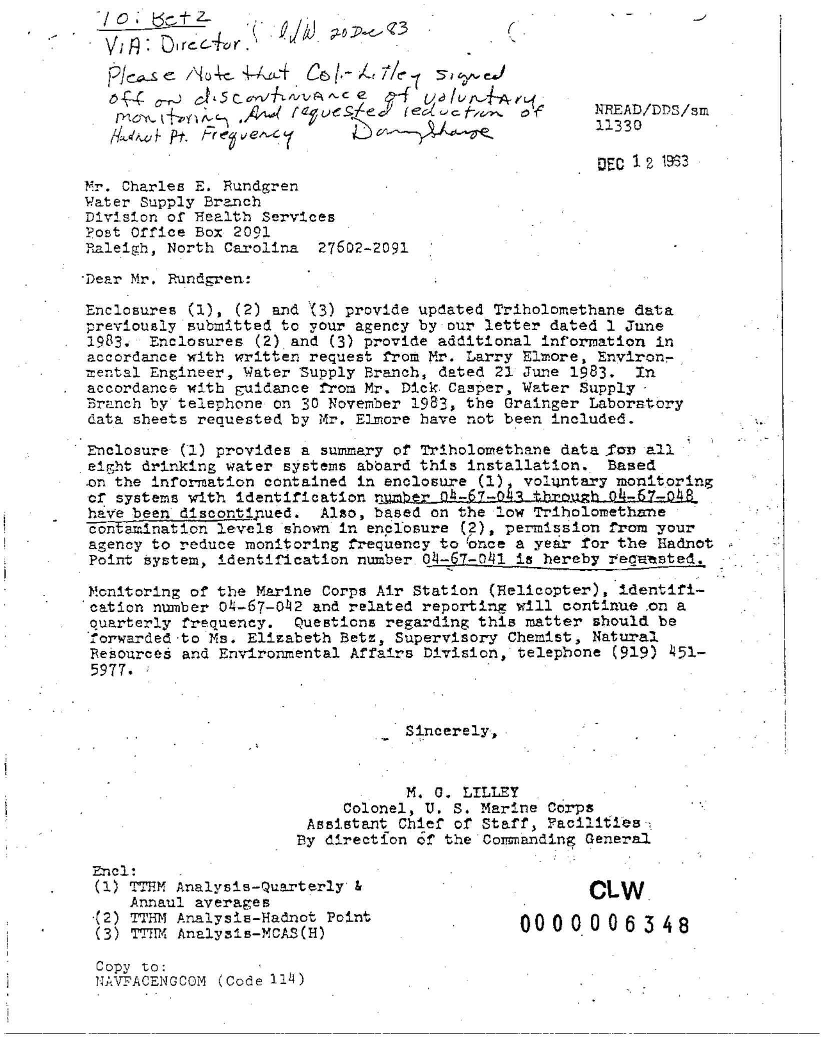
Wm. Larry Elmore

Wm. Larry Elmore
Environmental Engineer
Water Supply Branch
Environmental Health Section

WLE:spm

Enclosures

ENCLOSURE (4)



TO: Betz
VIA: Director. LJW 20Dec83
Please Note that Col. Lilley signed off on discontinuance of voluntary monitoring. And requested reduction of Hadnot Pt. Frequency   Danny Sharpe

NREAD/DDS/sm
11330

DEC 12 1983

Mr. Charles E. Rundgren
Water Supply Branch
Division of Health Services
Post Office Box 2091
Raleigh, North Carolina 27602-2091

Dear Mr. Rundgren:

Enclosures (1), (2) and (3) provide updated Triholomethane data previously submitted to your agency by our letter dated 1 June 1983. Enclosures (2) and (3) provide additional information in accordance with written request from Mr. Larry Elmore, Environmental Engineer, Water Supply Branch, dated 21 June 1983. In accordance with guidance from Mr. Dick Casper, Water Supply Branch by telephone on 30 November 1983, the Grainger Laboratory data sheets requested by Mr. Elmore have not been included.

Enclosure (1) provides a summary of Triholomethane data for all eight drinking water systems aboard this installation. Based on the information contained in enclosure (1), voluntary monitoring of systems with identification number 04-67-043 through 04-67-048 have been discontinued. Also, based on the low Triholomethane contamination levels shown in enclosure (2), permission from your agency to reduce monitoring frequency to once a year for the Hadnot Point system, identification number 04-67-041 is hereby requested.

Monitoring of the Marine Corps Air Station (Helicopter), identification number 04-67-042 and related reporting will continue on a quarterly frequency. Questions regarding this matter should be forwarded to Ms. Elizabeth Betz, Supervisory Chemist, Natural Resources and Environmental Affairs Division, telephone (919) 451-5977.

Sincerely,

M. G. LILLEY
Colonel, U. S. Marine Corps
Assistant Chief of Staff, Facilities
By direction of the Commanding General

Encl:
(1) TTHM Analysis-Quarterly & Annaul averages
(2) TTHM Analysis-Hadnot Point
(3) TTHM Analysis-MCAS(H)

Copy to:
NAVFACENGCOM (Code 114)

TOTAL TRIHALOMETHANE ANALYSIS
MARINE CORPS BASE, CAMP LEJEUNE

QUARTERLY & ANNUAL AVERAGES

units=ppm

System	ID#	1982 Apr-Jun	1982 Jul-Sep	1982 Oct-Dec	1983 Jan-Mar	Annual Average	1983 Apr-Jun	Annual Average	1983 Jul-Sep	Annual Average
Hadnot Point[1]	04-67-041	0.03	0.04	0.04	0.04	0.04	0.04[3]	0.04	0.04	0.04
MCAS-New River[1]	04-67-042	0.08	0.10	0.11	0.10	0.10	0.09[3]	0.10	0.11	0.10
Holcomb Blvd[2]	04-67-043	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
wa Terrace[2]	04-67-044	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Camp Johnson[2]	04-67-045	0.01	0.01	0.01	0.01[3]	0.01	0.01	0.01	0.01	0.01
Rifle Range[2]	04-67-046	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05
Courthouse Bay[2]	04-67-047	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.03	0.04
Onslow Beach[2]	04-67-048	0.05	0.04	0.04	0.04[4]	0.04[4]	0.04	0.04	0.03	0.04

Notes

1. Hadnot Point and Marine Corps Air Station-New River systems serve populations between 10,000-74,999.

2. These systems serve populations less than 10,000.

One of the distribution points were secured, so only four points were averaged instead of the usual five.

4. In February 1983, the Onslow Beach distribution points were secured. Therefore, the only point collected was at the beginning of the distribution system.

ENCLOSURE (1)

TOTAL TRIHALOMETHANE (TTHM) ANALYSIS SUMMARY
MARINE CORPS BASE, CAMP LEJEUNE

Name of Water System: Hadnot Point
Water System ID #: 04-67-041
Type of System: Community
Source of Water: Ground
Type of Sample: D-Regular
Parameter: Trihalomethane
Contaminant ID: 2950
Method Code: 215

Type of Treatment: (x) Chlorinated
(x) Fluoridated
(x) Filtered
(x) Lime
(x) Water Softener

Samples Collected by: Water Quality Control Lab (ID#37807)
Samples Analyzed by: Grainger Laboratories Inc (ID#37709)

		Sampling Site # 1 Bldg 20, WTP Plant Tap		Sampling Site # 2 Bldg NH-1 Consumer Tap		Sampling Site # 3 Bldg 1202 Consumer Tap		Sampling Site # 4 Bldg 65 Consumer Tap		Sampling Site # 5 Bldg FC-530 Consumer Tap	
Collected	Analyzed	Time	TTHM (mg/l)	Time	TTHM (mg/l)	Time	TTHM (mg/l)	Time	TTHM (mg/l)	Time	TTHM (mg/l)
04-22-82	05-03-82	1400	0.045	1410	0.051	1500	0.047	1530	0.047	1515	0.051
05-27-82	06-08-82	1133	0.027	1123	0.029	1333	0.028	1315	0.025	1345	0.028
06-25-82	07-08-82	1440	0.014	1455	0.015	1435	0.015	1510	0.014	1415	0.013
07-28-82	08-10-82	1100	0.041	1413	0.045	1347	0.042	1425	0.042	1358	0.047
11-26-82	12-08-82	1047	0.045	1056	0.042	1109	0.054	1138	0.045	1122	0.053
02-25-83	03-11-83	1505	0.040	1515	0.061	1445	0.041	1530	0.041	1453	0.041
05-27-83	06-10-83	1450	0.038	See Note	Below	1505	0.043	1514	0.039	1458	0.041
08-26-83	09-08-83	1459	0.038	1450	0.044	1509	0.039	1520	0.039	1515	0.041

ENCLOSURE (2)

TOTAL TRIHALOMETHANE (TTHM) ANALYSIS SUMMARY
MARINE CORPS BASE, CAMP LEJEUNE

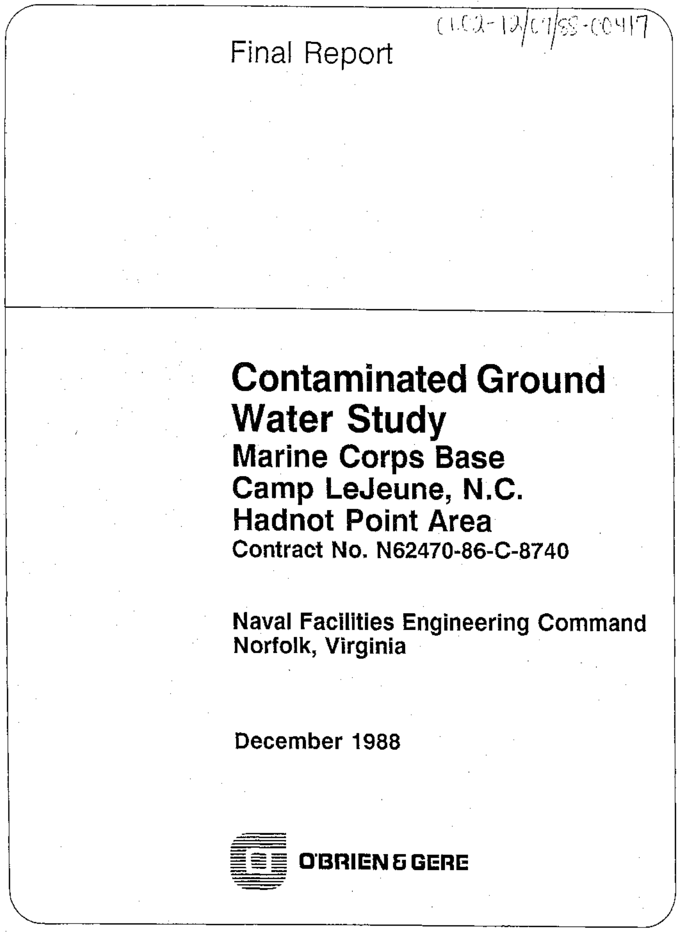
Name of Water System: Marine Corps Air Station
Water System ID #: 04-67-042
Type of System: Community
Source of Water: Ground
Type of Sample: D-Regular
Parameter: Trihalomethane
Contaminant ID: 2950
Method Code: 215

Type of Treatment: (x) Chlorinated
( ) Fluoridated
(x) Filtered
(x) Lime
(x) Water Softener

Samples Collected by: Water Quality Control Lab (ID#37807)
Samples Analyzed by: Grainger Laboratories Inc (ID#37709)

		Sampling Site # 1 Bldg AS-110, WTP Plant Tap		Sampling Site # 2 Bldg G-520 Consumer Tap		Sampling Site # 3 Bldg AS-4025 Consumer Tap		Sampling Site # 4 Bldg 710 Consumer Tap		Sampling Site # 5 Bldg 2800 Consumer Tap	
[illegible]cted	Analyzed	Time	TTHM (mg/l)	Time	TTHM (mg/l)	Time	TTHM (mg/l)	Time	TTHM (mg/l)	Time	TTHM (mg/l)
04-20-82	05-03-82	1255	0.051	1345	0.073	1310	0.120	1325	0.099	1335	0.100
05-28-82	06-09-82	1125	0.040	1110	0.096	1135	0.070	1155	0.083	1145	0.105
06-25-82	07-08-82	1005	0.052	0953	0.094	1020	0.092	1045	0.095	1035	0.118
07-29-82	08-10-82	1110	0.064	1209	0.124	1122	0.094	1145	0.094	1135	0.135
08-17-82	08-31-82	0953	0.082	1040	0.133	1205	0.145	1235	0.143	1225	0.142
09-21-82	09-30-82	1235	0.050	1320	0.111	1247	0.081	1312	0.077	1300	0.101
11-29-82	12-08-82	1115	0.049	1150	0.127	1202	0.113	1141	0.091	1133	0.125
12-29-82	01-13-83	1305	0.057	1350	0.126	1315	0.141	1335	0.124	1325	0.121
01-26-83	02-04-83	1305	0.047	1357	0.128	1317	0.116	1338	0.107	1328	0.097
[illegible]-83	03-11-83	1245	0.058	1332	0.131	1257	0.108	1320	0.108	1310	0.102
05-27-83	06-10-83	1144	0.048	See Note Below		1154	0.084	1212	0.109	1204	0.139
08-26-83	09-08-83	1303	0.062	1254	0.125	1317	0.133	1340	0.093	1330	0.129

ENCLOSURE (3



01.02-12/01/88-00417

Final Report

Contaminated Ground Water Study

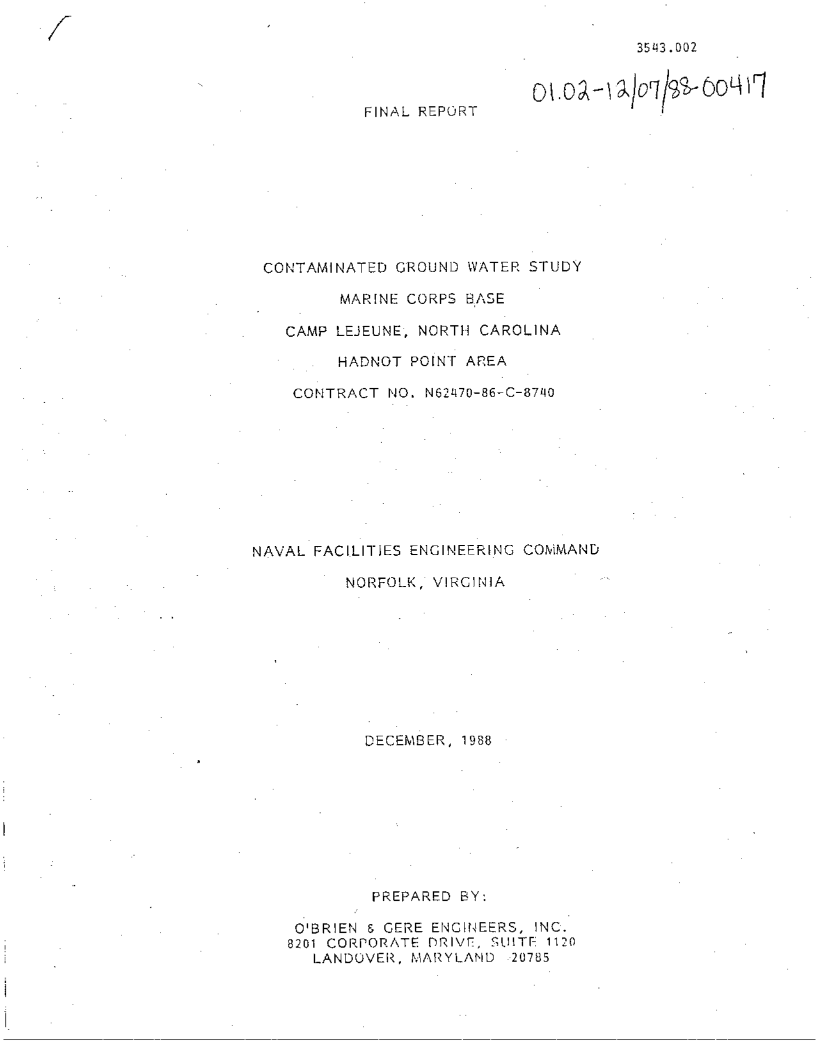
Marine Corps Base
Camp LeJeune, N.C.
Hadnot Point Area

Contract No. N62470-86-C-8740

Naval Facilities Engineering Command
Norfolk, Virginia

December 1988

O'BRIEN & GERE



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01.02-12/07/88-00417

FINAL REPORT

CONTAMINATED GROUND WATER STUDY
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
HADNOT POINT AREA
CONTRACT NO. N62470-86-C-8740

NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA

DECEMBER, 1988

PREPARED BY:

O'BRIEN & GERE ENGINEERS, INC.
8201 CORPORATE DRIVE, SUITE 1120
LANDOVER, MARYLAND 20785

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A Monitoring Well Installation Procedures
B Boring Logs
C Well Construction Diagrams
D Sampling Protocols
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SECTION 1 - INTRODUCTION

1.01 Site Description

Marine Corps Base (MCB) Camp Lejeune is located in Onslow County, North Carolina (Figure 1). The facility has a roughly triangular outline and covers approximately 170 square miles. Eleven miles of Atlantic shoreline form the eastern boundary of Camp Lejeune. The western and northeastern boundaries are U.S. Rt. 17 and State Rt. 24, respectively. The town of Jacksonville, North Carolina is the northern boundary of the base (ESE, 1985).

Construction of MCB Camp Lejeune began in 1941, at the Hadnot Point area, where major functions were centered. As the facility grew and developed, Hadnot Point became crowded with maintenance and industrial activities (Water and Air Research, 1983). The general Hadnot Point area is illustrated on Figure 2.

The Hadnot Point Fuel Farm (HPFF), the specific area of this hydrogeologic investigation, is located approximately 1200 feet to the southeast of Holcombe Boulevard, adjacent to Ash Street as depicted on Figure 1. The HPFF was constructed in about 1941 and consists of 15 fuel storage tanks. There is one (1) above ground 600,000 gallon tank (Tank 10), six underground (6) 12,000 gallon tanks (Tanks 2, 3, 7, 8 11, 12), and eight underground (8) 15,000 gallon tanks (Tanks 1, 4, 5, 6, 9, 13, 14, and 15). All tanks except the 600,000 gallon tank were originally placed at grade and completely covered with soil. The existing tanks are the original tanks that were installed in about 1941. The large 600,000 gallon tank contains diesel fuel, the other tanks contain leaded gasoline, unleaded gasoline and kerosene.

The area surrounding the tank farm is relatively flat, with the soil covered tank farm forming a topographic mound that extends approximately 10 feet above the surrounding grade. It is a highly developed area of the base. The natural drainage has been modified by extensive areas of asphalt and concrete, and by ditches and storm sewers. The surface water body in nearest proximity to the tank farm is Beaverdam Creek, located approximately 2000 feet east of the Tank Farm. Beaverdam Creek drains into Wallace Creek, which discharges into New River as shown on Figure 1.

1.02 Background Purpose and Scope

Previous investigations have indicated that leaks may have occurred in the fuel lines and tanks within the HPFF (Water and Air Research, 1983) and that dissolved fuel constituents and/or a floating product layer may exist within the shallow ground water in the vicinity of the tank farm (ESE, 1988).

The characterization Step Report for Hadnot Point Industrial Area (HPIA) prepared by ESE in 1988 summarizes the results of the Verification Step Study conducted by ESE in 1985 and presents the findings of the Characterization Step Study. The study efforts encompassed the entire HPIA, a portion of which focused specifically on the HPFF. These investigations identified the presence of volatile organic compounds (VOC's) within both the shallow aquifer at the tank farm and a single deep supply well located approximately 1200 to the northwest of the HPFF. Specifically, shallow ground water samples were found to contain elevated levels of fuel-derived compounds such as benzene, ethylbenzene, toluene, and lead.

O'Brien & Gere Engineers was retained to provide the follow-up hydrogeologic services necessary to investigate the hydrogeology and evaluate the extent of fuel leakage from the underground storage tanks and associated transfer lines at the HPFF, as indicated by the previous studies.

The purpose of this Investigation Report is to present the information that has been gathered during the hydrogeologic investigation regarding the presence of any product pool or soluble hydrocarbons in the ground water in the vicinity of Hadnot Point area. A site investigation was completed which included monitoring well installations, product thickness measurements, and ground water sampling and analysis. This report presents a summary of the hydrogeologic conditions at the site and an assessment of the petroleum hydrocarbon occurrence, as well as recommendations for further investigations and site remediation.

SECTION 2 - HISTORY OF FUEL LOSSES

2.01 History of Fuel Losses

Available information regarding the history of fuel losses and leakage areas was reviewed in order to identify potential areas of petroleum product accumulation. The areas of investigation included the age of the tanks, locations of known losses, inventory records, and types and volumes of fuel losses. A summary of fuel losses is given in Table 1, and the fuel loss locations are shown on Figure 3.

As stated in Section 1.01, the tanks were installed in about 1941. The other information about the history of fuel losses at the HPFF is summarized in the Preliminary Report.

Review of this information indicates that between 23,150 gallons and 33,150 gallons of fuel product have been lost from the tank farm. In addition, there have been two recorded episodes of fuel loss where the amounts lost were unknown; in another case, the amount lost was not noticeable in inventory.

Of the 23,150-33,150 gallons of known lost product, 3,150 gallons were unleaded fuel. The 20,000-30,000 gallon loss that occurred in 1979 was comprised of unknown amounts of diesel and unleaded fuel; regular fuel may also have been lost. Of the two instances where unknown amounts of fuel were lost, one was diesel fuel and the other was unleaded fuel.

Inventory records do not reveal any known fuel losses from leakage of the tanks; most of the losses have likely occurred through leaks in the transfer lines or through leaks in transfer line valves.

SECTION 3 - FIELD INVESTIGATIONS

3.01 Monitoring Well Installations

A total of twenty (20) ground water monitoring wells were installed in the vicinity of the HPFF from February to March, 1988 by ATEC Associates, Inc. of Raleigh, NC, under the supervision of an O'Brien & Gere Engineers, Inc. hydrogeologist. The locations of the monitoring wells were based upon consideration of the hydrogeologic conditions and the assessment of petroleum leakage in the study area. The placement of the wells, as illustrated in Figure 4, was selected to provide a preliminary assessment of the extent of any product pool, and to confirm the previously evaluated hydrogeologic conditions. The locations for the initial ten (10) 2 inch inside diameter (I.D.) wells were selected to provide a preliminary assessment of the extent of the petroleum hydrocarbons. Based upon field evaluation of this preliminary data, locations for five (5) additional 2 inch I.D. monitoring wells, and five (5) 4 inch I.D. monitoring wells were selected. The criteria for the selection of additional well locations included estimated ground water flow directions, geologic conditions, observations of any encountered petroleum product, and soil sample screening (discussed below).

During the drilling program, the boreholes were advanced using conventional hollow stem auger drilling methods. Samples of the subsurface materials were collected at a minimum of every five feet or as directed by the supervising hydrogeologist, using ASTM method D-1586 for split barrel sampling.

Each soil sample was screened in the field using a photoionization organic vapor detector to identify the presence of any petroleum product within the soils. The field screening provided a preliminary assessment of the vertical and horizontal extent of petroleum hydrocarbons. These data were used, in conjunction with the other criteria discussed above, to select the optimum locations of the other monitoring wells during the drilling program. The locations of the five (5) 4 inch I.D. wells were selected to serve as potential product and/or ground water recovery wells. All wells were installed and constructed in accordance with applicable North Carolina, Federal and NAVFAC specifications and guidelines following the attached monitoring well installation procedures (Appendix A).

Wells MW-1 and MW-2 are 17 feet deep, with the screened interval extending from 7 to 17 feet below the ground surface. Wells MW-3 through MW-10 are 15 feet deep with the screened interval extending from 5 to 15 feet below the ground surface. Due to the thickness of product found in MW-2 and MW-7, it was decided to increase the depth of the remaining wells to 25 feet in order to intersect the entire thickness of any floating product layer. Wells MW-11 through MW-20 were 25 feet deep with the screened interval extending from 5 to 25 feet. Boring logs containing detailed descriptions of the subsurface conditions and well construction diagrams were prepared for each well location and are included in Appendices B and C, respectively.

All equipment used in the drilling and well installation program that came in contact with potentially contaminated materials was decontaminated using high pressure steam cleaning equipment. The water source for the steam cleaner was a potable water supply designed by navy personnel. The fluid generated by the decontamination

CLW 709
pg. 133
Referenced.

22

Name: Industrial Area Tank Farm

Location: PWDM Coordinates 10, J15; east of intersection of Cribb Road and Ash Street.

Figures and Photos: 2-1, 6-3, 6-12, 6-13a

Size: Area estimated at 3.5 to 4 acres.

Previously Reported: No

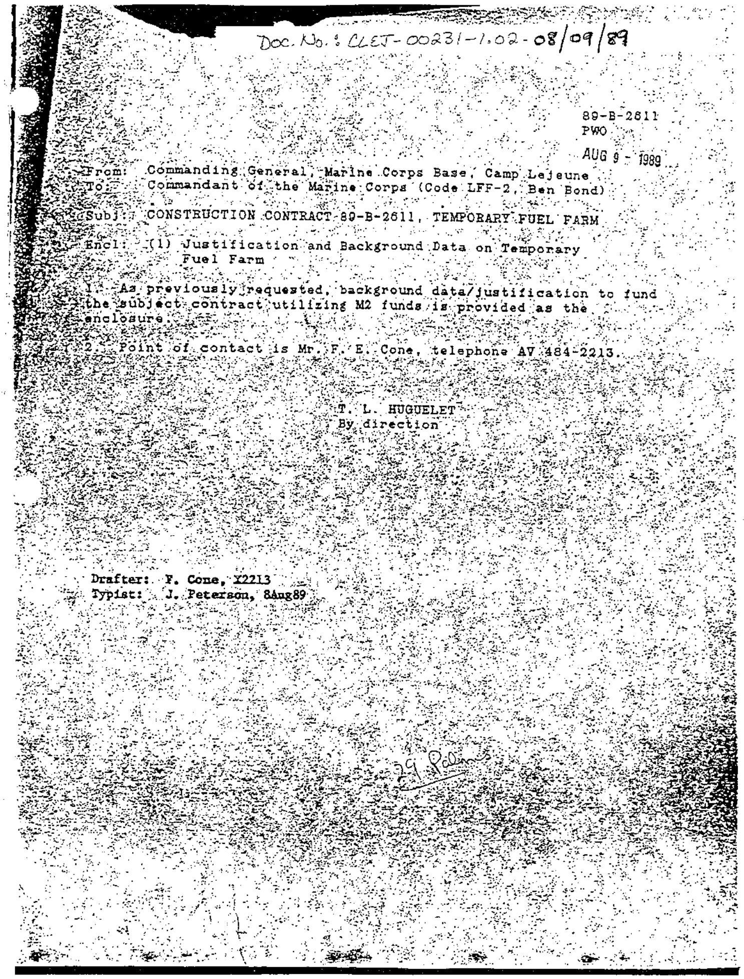
Activity: Site is a fuel storage and dispensing area for vehicles. Leakage has occurred from fuel lines.

Materials Involved: Diesel, unleaded and possibly leaded gasoline

Quantity: 20,000 to 50,000 gallons from an underground line near the tank truck loading facility

When: 1979

Comments: Fuel farm installed in 1940s. There have been problems with leaks. The latest was a 100-gallon leak of diesel fuel in 1981. In 1979, a fuel leak of an estimated 20,000 to 30,000 gallons occurred. The leak was in an underground line slightly to the rear of the tank truck loading facility and between the building and the large aboveground fuel tank. Fuel has been lost through pinhole leaks in the underground lines. There is no evidence of extensive corrosion in the system. Control is maintained by an established fuel audit system.



Doc. No.: CLEJ-00231-1.02-08/09/89

89-B-2611
PWO

AUG 9 - 1989

From: Commanding General, Marine Corps Base, Camp Lejeune
To: Commandant of the Marine Corps (Code LFF-2, Ben Bond)

Subj: CONSTRUCTION CONTRACT 89-B-2611, TEMPORARY FUEL FARM

Encl: (1) Justification and Background Data on Temporary
Fuel Farm

1. As previously requested, background data/justification to fund the subject contract utilizing M2 funds is provided as the enclosure.

2. Point of contact is Mr. F. E. Cone, telephone AV 484-2213.

T. L. HUGUELET
By direction

Drafter: F. Cone, X2213
Typist: J. Peterson, 8Aug89

29 Palms

Doc No: CLEJ-00231-1.02-8/9/84

CAMP LEJEUNE FUEL FARM

Background: The Camp Lejeune Fuel Farm was originally constructed in 1943 (currently 45 years old). The fuel farm consists of 17 tanks ranging in size from 3,000 gallons to 600,000 gallons. The majority of the tanks are in the 12,000 to 15,000 gallon range. The fuel farm also includes an outdated, congested refueling area and dispatch building. Unloading facilities are considered inadequate. Fuel leaks have been detected and repaired (to the extent possible) on several occasions over the years. A recent study by O'Brien and Gere (consulting firm) of the ground water in the area (excerpts included as attachment (1)) indicates significant amounts of free fuel are located under the fuel farm. Further, several potable water wells in the fuel farm area have been shut down due to the detection of benzene and other chemicals in the water.

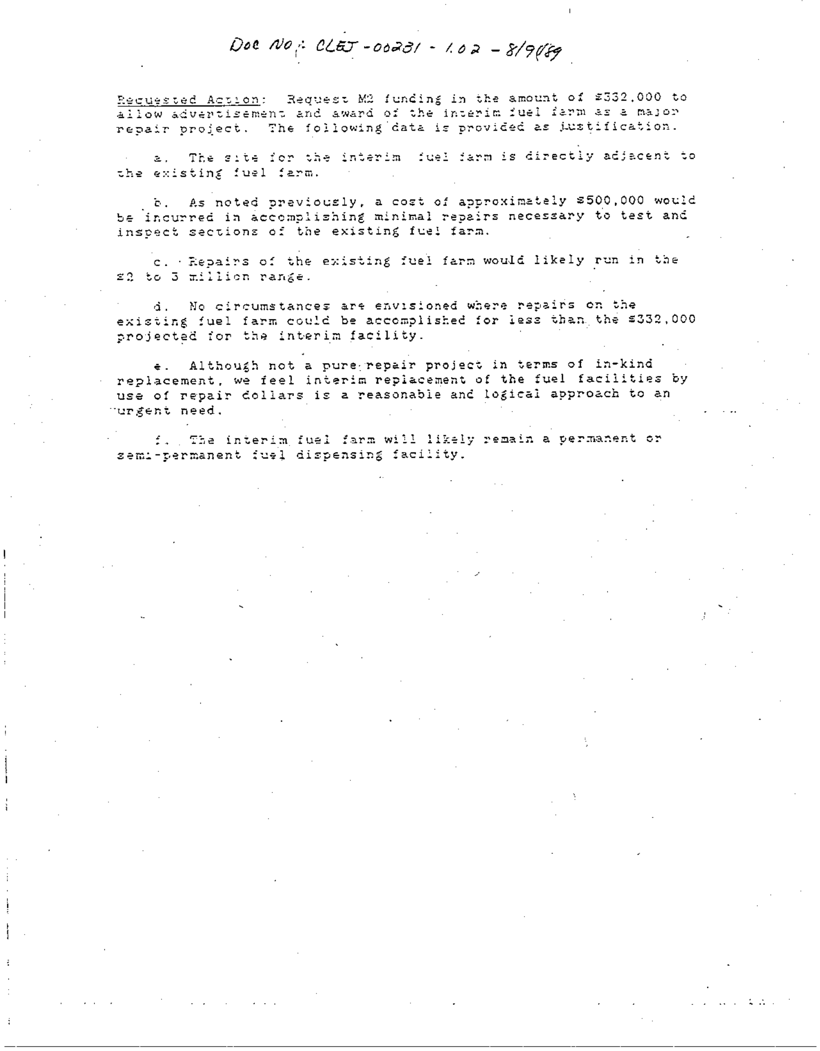
Past Action: During the early 1980s, several actions were taken in an attempt to correct problems associated with the fuel farm. A condition survey (attachment (2)) indicated significant discrepancies with the existing tanks and piping. Further, HQMC Projects LE201M and LE433R (attachments (3) and (4)) were initiated to test and correct specific discrepancies. During design of Project LE201M, it was discovered that the cost to replace valves (necessary to isolate the tanks to allow leakage testing and inspection) would cost between $300,000 and $500,000. Because of the age of the tanks (+40 years), a decision was made that the fuel farm was beyond its expected life and that expenditures of $500,000 to merely determine the condition of the 40-year old tanks and piping would be wasteful. A decision was made to cancel major repairs to the fuel farm and to submit under the Military Construction Program to obtain a new fuel farm at a new location.

Current Status: The O'Brien and Gere study indicates significant leakage from the underground storage tanks and piping. Upon receipt of this study, the following actions were taken:

a. Notification to the State of North Carolina required by regulation, including notice that the fuel farm would be immediately shutdown (attachment (5)).

b. Notification to LANTDIV to proceed with design of clean-up and closure plan.

c. Design of a temporary fuel farm adjacent to the existing fuel farm until funding and completion of the future MILCON project. The fuel farm is currently still in operation. A compliance order is expected in the near future from the State of North Carolina regarding the fuel farm. Design of the temporary fuel farm as an interim fix is completed. Additional data regarding the fuel farm is provided as attachment (6). To date, funding has not been provided for the project.



Doc No: CLEJ-00231 - 1.02 - 8/9/89

Requested Action: Request M2 funding in the amount of $332,000 to allow advertisement and award of the interim fuel farm as a major repair project. The following data is provided as justification.

a. The site for the interim fuel farm is directly adjacent to the existing fuel farm.

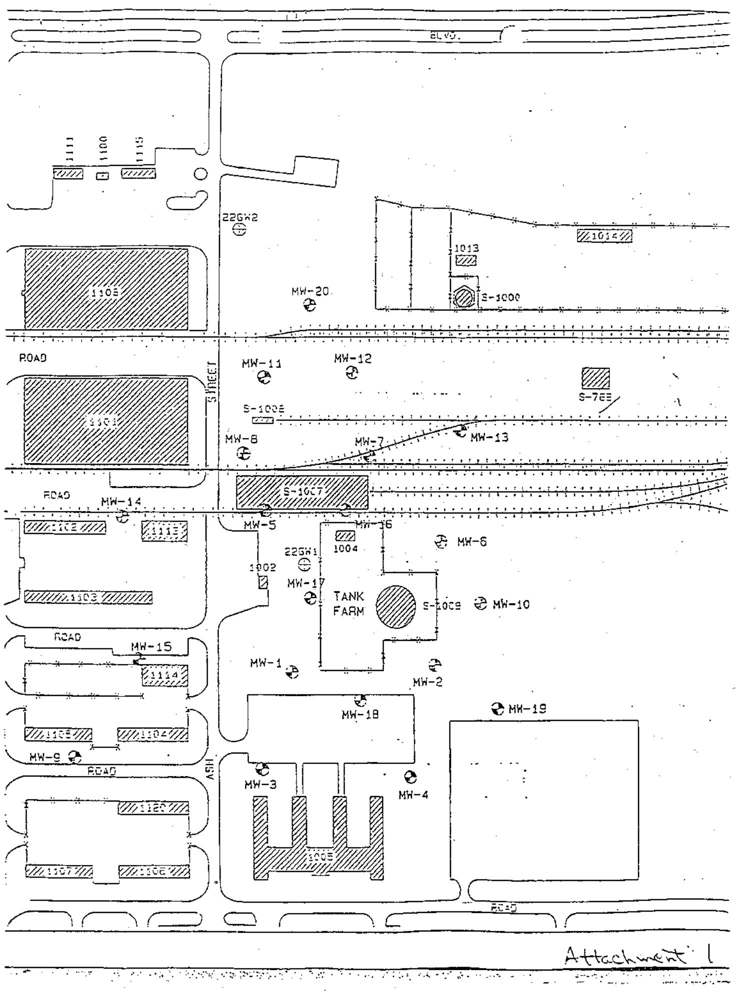
b. As noted previously, a cost of approximately $500,000 would be incurred in accomplishing minimal repairs necessary to test and inspect sections of the existing fuel farm.

c. Repairs of the existing fuel farm would likely run in the $2 to 3 million range.

d. No circumstances are envisioned where repairs on the existing fuel farm could be accomplished for less than the $332,000 projected for the interim facility.

e. Although not a pure repair project in terms of in-kind replacement, we feel interim replacement of the fuel facilities by use of repair dollars is a reasonable and logical approach to an urgent need.

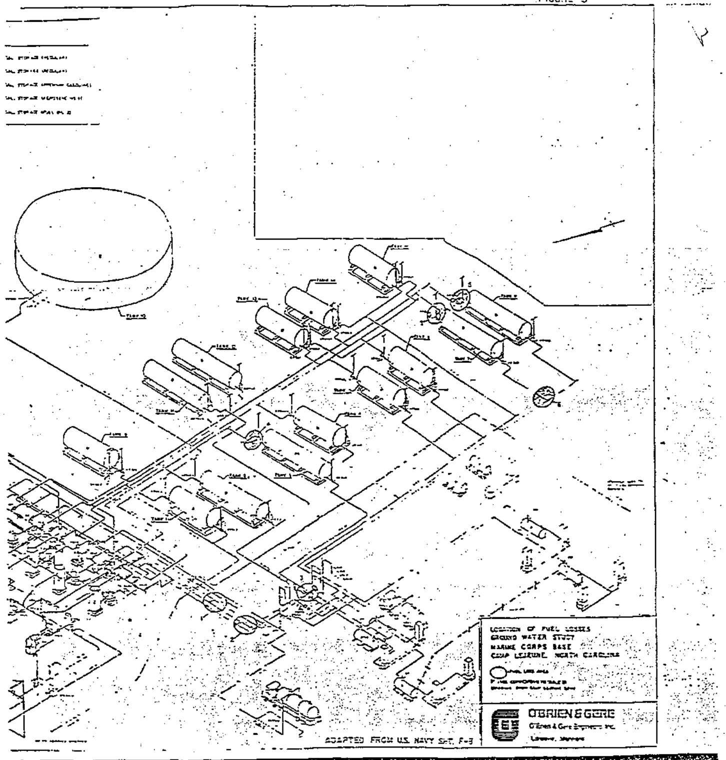
f. The interim fuel farm will likely remain a permanent or semi-permanent fuel dispensing facility.



Attachment 1

Doc No: CLEJ - 00231 - 1.02 - 08/07/89

FIGURE 3



ADAPTED FROM U.S. NAVY SHT. F-3

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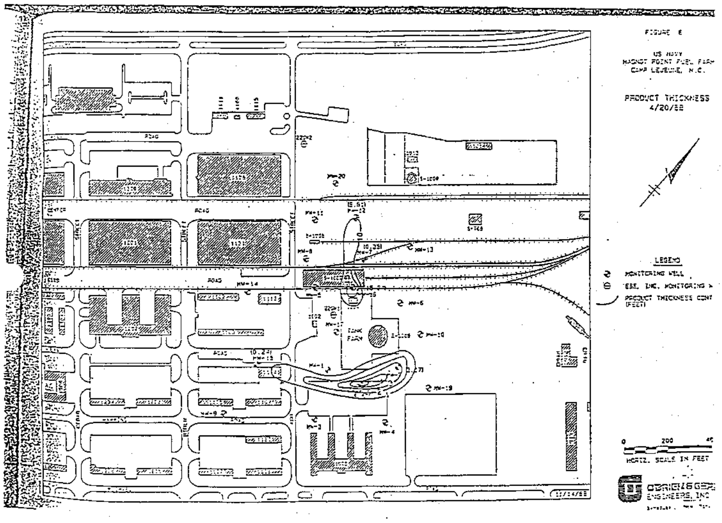
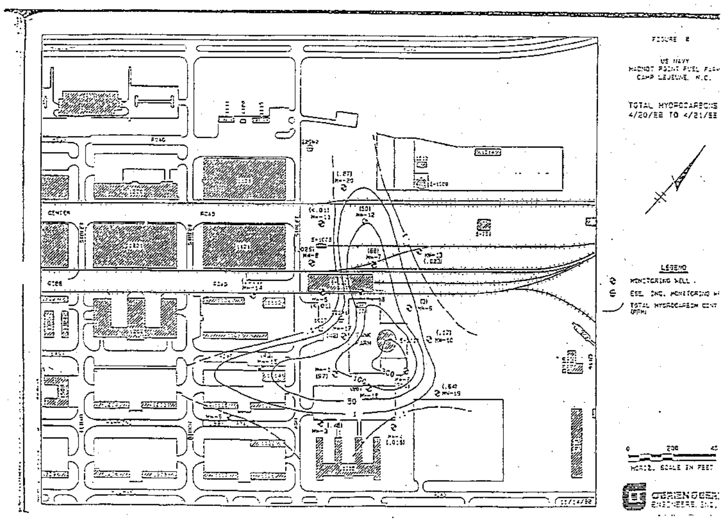
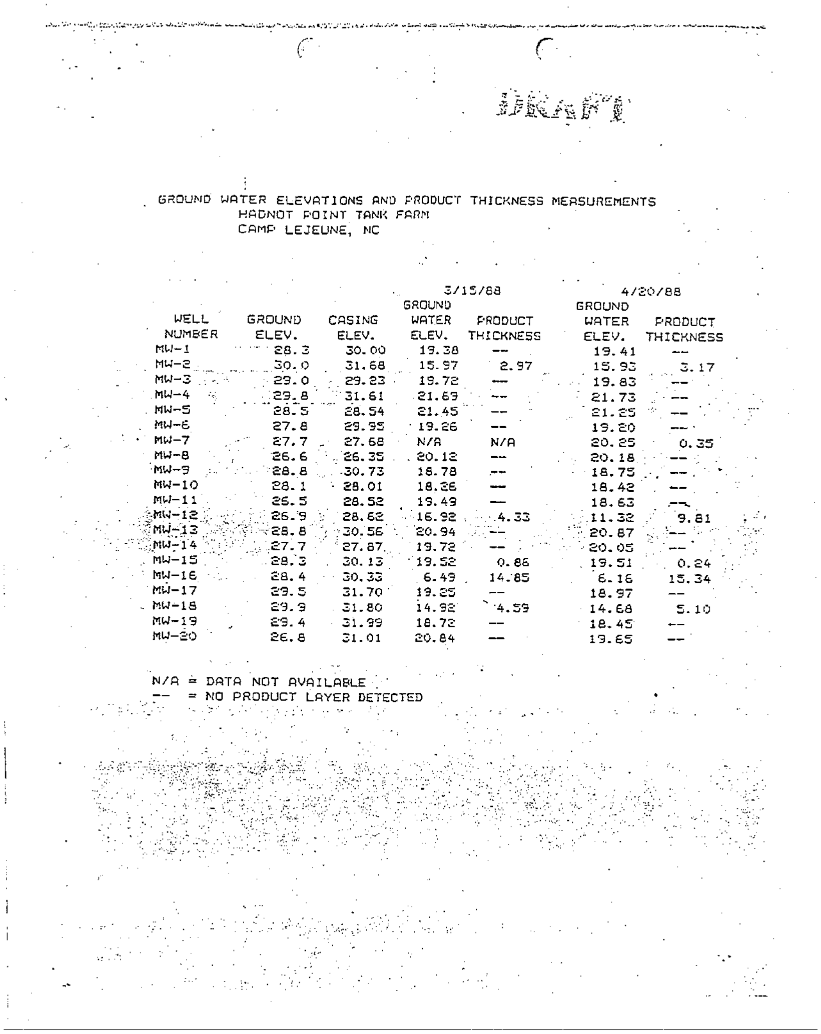


Doc NO: CLEJ-00231-1.02-8/9/89





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GROUND WATER ELEVATIONS AND PRODUCT THICKNESS MEASUREMENTS
HADNOT POINT TANK FARM
CAMP LEJEUNE, NC

WELL NUMBER	GROUND ELEV.	CASING ELEV.	3/15/88		4/20/88	
			GROUND WATER ELEV.	PRODUCT THICKNESS	GROUND WATER ELEV.	PRODUCT THICKNESS
MW-1	28.3	30.00	19.38	--	19.41	--
MW-2	30.0	31.68	15.97	2.97	15.93	3.17
MW-3	29.0	29.23	19.72	--	19.83	--
MW-4	29.8	31.61	21.69	--	21.73	--
MW-5	28.5	28.54	21.45	--	21.25	--
MW-6	27.8	29.95	19.26	--	19.20	--
MW-7	27.7	27.68	N/A	N/A	20.25	0.35
MW-8	26.6	26.35	20.12	--	20.18	--
MW-9	28.8	30.73	18.78	--	18.75	--
MW-10	28.1	28.01	18.26	--	18.42	--
MW-11	26.5	28.52	19.49	--	18.63	--
MW-12	26.9	28.62	16.92	4.33	11.32	9.81
MW-13	28.8	30.56	20.94	--	20.87	--
MW-14	27.7	27.87	19.72	--	20.05	--
MW-15	28.3	30.13	19.52	0.86	19.51	0.24
MW-16	28.4	30.33	6.49	14.85	6.16	15.34
MW-17	29.5	31.70	19.25	--	18.97	--
MW-18	29.9	31.80	14.92	4.59	14.68	5.10
MW-19	29.4	31.99	18.72	--	18.45	--
MW-20	26.8	31.01	20.84	--	19.65	--

N/A = DATA NOT AVAILABLE
-- = NO PRODUCT LAYER DETECTED

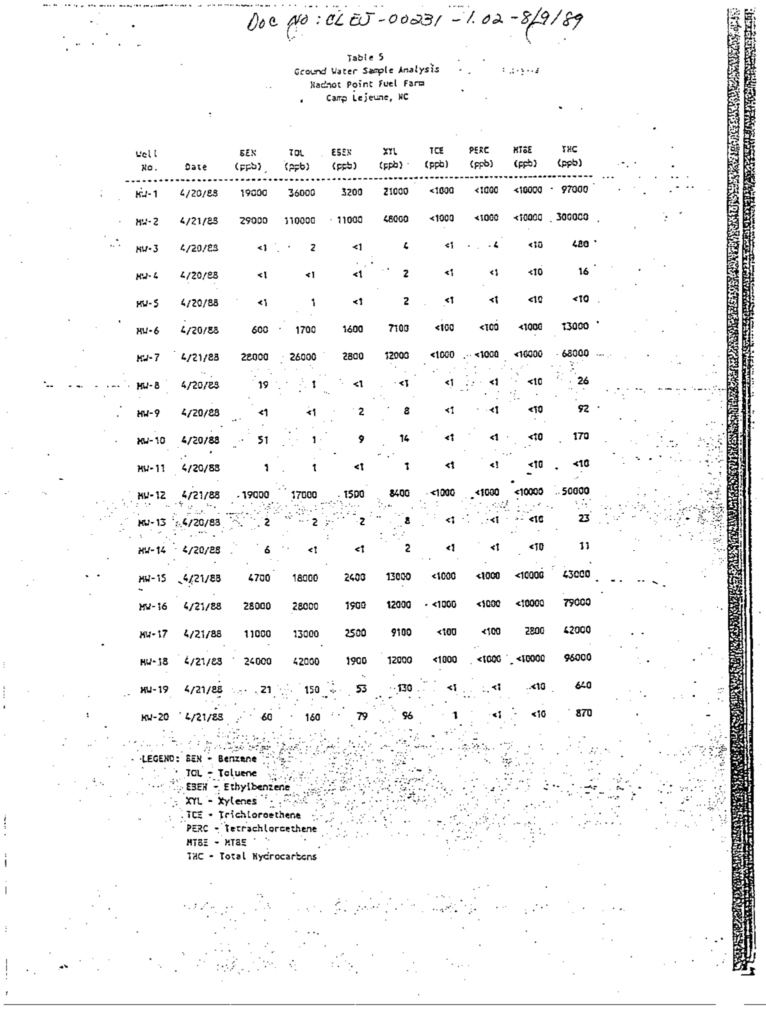

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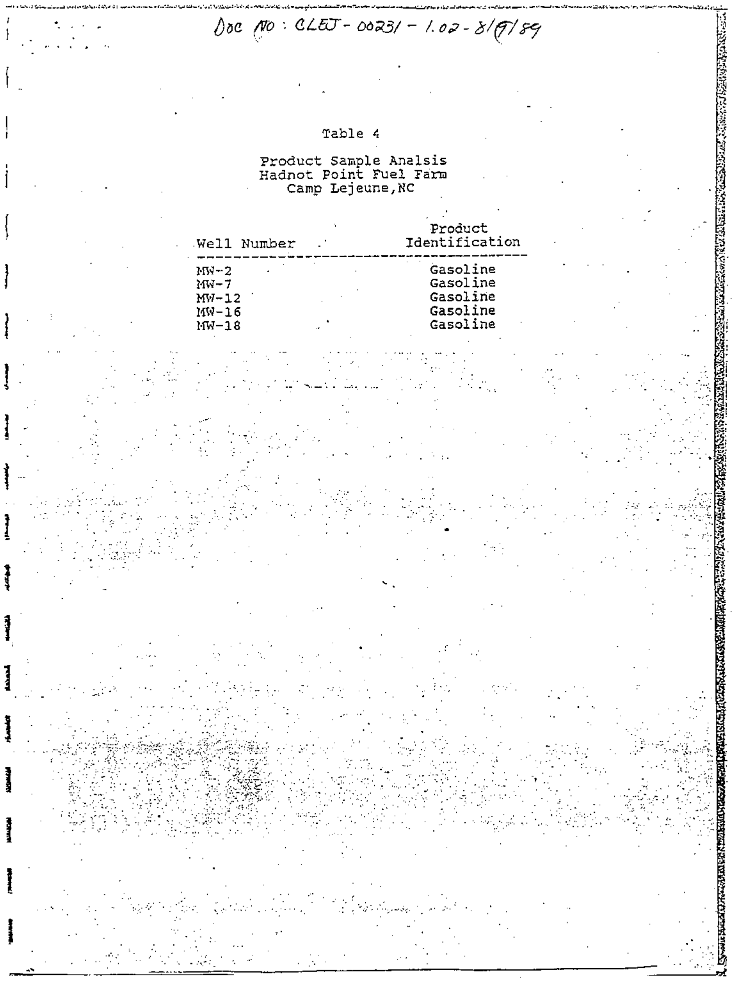
Table 5
Ground Water Sample Analysis
Hadnot Point Fuel Farm
Camp Lejeune, NC

Well No.	Date	BEN (ppb)	TOL (ppb)	EBEN (ppb)	XYL (ppb)	TCE (ppb)	PERC (ppb)	MTBE (ppb)	THC (ppb)
MW-1	4/20/88	19000	36000	3200	21000	<1000	<1000	<10000	97000
MW-2	4/21/88	29000	110000	11000	48000	<1000	<1000	<10000	300000
MW-3	4/20/88	<1	2	<1	4	<1	4	<10	480
MW-4	4/20/88	<1	<1	<1	2	<1	<1	<10	16
MW-5	4/20/88	<1	1	<1	2	<1	<1	<10	<10
MW-6	4/20/88	600	1700	1600	7100	<100	<100	<1000	13000
MW-7	4/21/88	28000	26000	2800	12000	<1000	<1000	<10000	68000
MW-8	4/20/88	19	1	<1	<1	<1	<1	<10	26
MW-9	4/20/88	<1	<1	2	8	<1	<1	<10	92
MW-10	4/20/88	51	1	9	14	<1	<1	<10	170
MW-11	4/20/88	1	1	<1	1	<1	<1	<10	<10
MW-12	4/21/88	19000	17000	1500	8400	<1000	<1000	<10000	50000
MW-13	4/20/88	2	2	2	8	<1	<1	<10	23
MW-14	4/20/88	6	<1	<1	2	<1	<1	<10	11
MW-15	4/21/88	4700	18000	2400	13000	<1000	<1000	<10000	43000
MW-16	4/21/88	28000	28000	1900	12000	<1000	<1000	<10000	79000
MW-17	4/21/88	11000	13000	2500	9100	<100	<100	2800	42000
MW-18	4/21/88	24000	42000	1900	12000	<1000	<1000	<10000	96000
MW-19	4/21/88	21	150	53	130	<1	<1	<10	640
MW-20	4/21/88	60	160	79	96	1	<1	<10	870

LEGEND: BEN - Benzene
TOL - Toluene
EBEN - Ethylbenzene
XYL - Xylenes
TCE - Trichloroethene
PERC - Tetrachloroethene
MTBE - MTBE
THC - Total Hydrocarbons

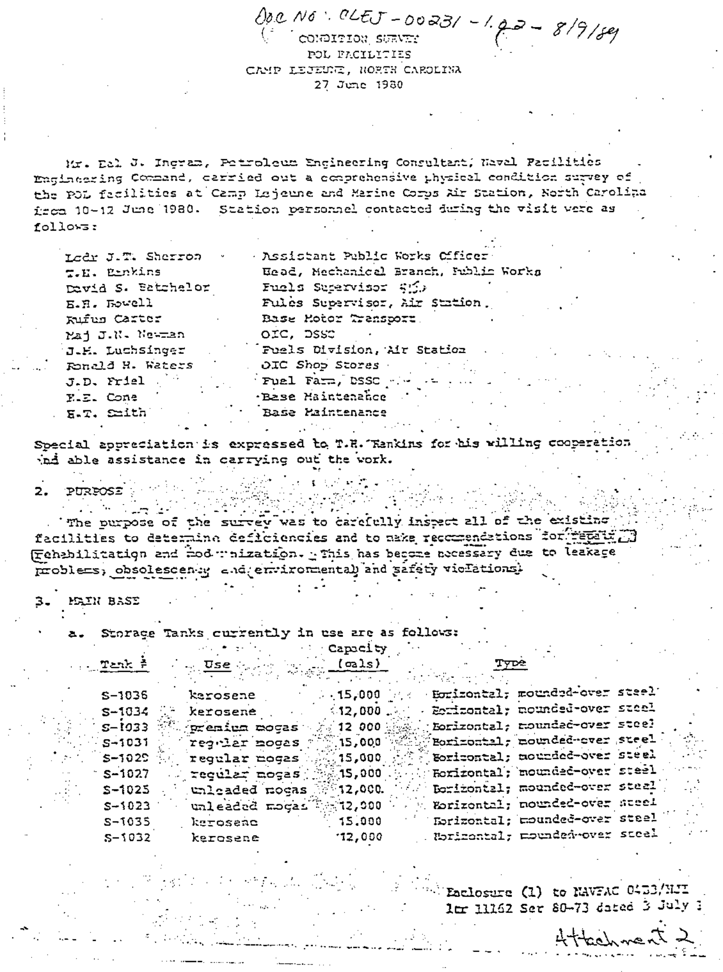


Doc No : CLEJ - 00231 - 1.02 - 8/9/89

Table 4

Product Sample Analsis
Hadnot Point Fuel Farm
Camp Lejeune,NC

Well Number	Product Identification
MW-2	Gasoline
MW-7	Gasoline
MW-12	Gasoline
MW-16	Gasoline
MW-18	Gasoline



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CONDITION SURVEY
POL FACILITIES
CAMP LEJEUNE, NORTH CAROLINA
27 June 1980

Mr. Dal J. Ingram, Petroleum Engineering Consultant, Naval Facilities Engineering Command, carried out a comprehensive physical condition survey of the POL facilities at Camp Lejeune and Marine Corps Air Station, North Carolina from 10-12 June 1980. Station personnel contacted during the visit were as follows:

Lcdr J.T. Sherron	Assistant Public Works Officer
T.H. Rankins	Head, Mechanical Branch, Public Works
David S. Batchelor	Fuels Supervisor
E.H. Howell	Fules Supervisor, Air Station
Rufus Carter	Base Motor Transport
Maj J.N. Newman	OIC, DSSC
J.H. Luchsinger	Fuels Division, Air Station
Ronald H. Waters	OIC Shop Stores
J.D. Friel	Fuel Farm, DSSC
H.E. Cone	Base Maintenance
E.T. Smith	Base Maintenance

Special appreciation is expressed to T.H. Rankins for his willing cooperation and able assistance in carrying out the work.

2. PURPOSE

The purpose of the survey was to carefully inspect all of the existing facilities to determine deficiencies and to make recommendations for repair, rehabilitation and modernization. This has become necessary due to leakage problems, obsolescency and environmental and safety violations.

3. MAIN BASE

a. Storage Tanks currently in use are as follows:

Tank #	Use	Capacity (gals)	Type
S-1036	kerosene	15,000	Horizontal; mounded-over steel
S-1034	kerosene	12,000	Horizontal; mounded-over steel
S-1033	premium mogas	12 000	Horizontal; mounded-over steel
S-1031	regular mogas	15,000	Horizontal; mounded-over steel
S-1029	regular mogas	15,000	Horizontal; mounded-over steel
S-1027	regular mogas	15,000	Horizontal; mounded-over steel
S-1025	unleaded mogas	12,000	Horizontal; mounded-over steel
S-1023	unleaded mogas	12,000	Horizontal; mounded-over steel
S-1035	kerosene	15,000	Horizontal; mounded-over steel
S-1032	kerosene	12,000	Horizontal; mounded-over steel

Enclosure (1) to NAVFAC 0433/NJI
ltr 11162 Ser 80-73 dated 3 July

Attachment 2

[redacted] Doc No: CLEJ - 00231 - 1.02 - 8/9/89 [redacted]

Tank #	Use	[illegible]	
S-1030	kerosene	12,000	Horizontal; mounded-over steel
S-1028	regular mogas	15,000	Horizontal; mounded-over steel
S-1026	regular mogas	15,000	Horizontal; mounded-over steel
S-1024	regular mogas	15,000	Horizontal; mounded-over steel
00 0048	regular ~~mogas~~ [illegible]	2,900	Horizontal; underground steel
00 004B	kerosene	2,700	Horizontal; underground steel
S-1009	DF-2	600,000	Vertical; aboveground steel

b. Total storage capacity is as follows:

DF-2	600,000 gallons
regular mogas	90,000 gallons
unleaded mogas	24,000 gallons
premium mogas	12,000 gallons
kerosene	72,000 gallons

= 990K Black Oil

798

c. Total amount of fuel issued from 1 June 1979 to 31 May 1980 was as follows:

DF-2	3,433,752 gallons
regular mogas	926,310 gallons
unleaded mogas	871,625 gallons
premium mogas	70,856 gallons
kerosene	592,242 gallons

5,898,785

d. Observations and Discussion.

(1) Based on the foregoing storage and issue data, existing storage capacity is considered adequate. This does not take into account contingency planning or mission changes which were not available to the investigator.

(2. These fuel facilities are approximately 35 years old. Because of age, there has been general corrosion and deterioration of the tanks and pipelines. Maintenance over the years has been minimal due to insufficient funding. Likewise, modification funding to keep abreast of the latest state-of-the-art has not been available.

(3) Some fuel facility deficiencies where Camp Lejeune has not kept pace with new fueling system design concepts include such items as automatic high liquid level alarms, tank coatings, dead man control, impervious diked areas and containment curbs with oil-water separators for truck fill stands.

(4) As far as could be determined, the fuel storage tanks have never been cleaned since they were built. Also, until recently, there was no regular scheduled program for water draw-off. There are many buried valves and buried flanges that cannot be inspected or maintained.

(5) About two years ago automatic liquid level indicators were installed in all the tanks with a central readout console in Pumphouse No. 1004. This

Doc No : CLEJ - 00231 - 1.02 - 8/9/89

ystem has never been operable since it was completed. The tape on the float e in Tank No. S-1009 had been removed. It was reported a contract had ently been negotiated with a firm to come in and repair this system, calibrate t and put it into operation.

(6) Inspection of aboveground Tank No. S-1009 showed the exterior oating was beginning to peel and there is evidence of rust. There were some articularly bad spots on the tank top. The diked area was obviously not mpervious and the holding capacity appeared insufficient. There was no flat rea on the basin floor around the tank and dirt and weeds were on top of the ing foundation around the tank perimeter. There was no oil-water separator n the drain line from the basin area and the drain valve had no lock to prevent nauthorized opening.

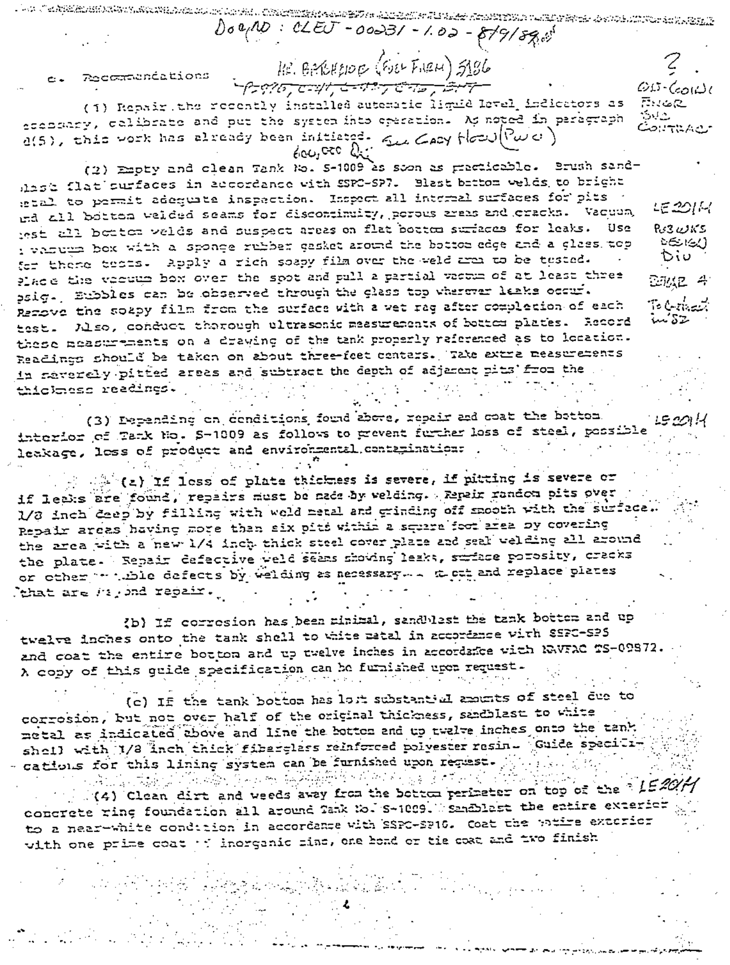
(7) The base had attempted to empty and vapor free Tank No. S-1031 for a thorough internal inspection. A leaking tank valve was discovered which made it impossible to vapor free the tank. Observations were made through the manhole without actual tank entry. The tank shell around the sides appeared to be in excellent condition with only minor surface corrosion. There was a narrow strip along the bottom about one foot wide the full length of the tank which showed somewhat more corrosion and pitting. There was no way to actually measure pit depths or take ultrasonic thickness readings. The best assumptions that could be made were that there were no perforations, but probably some significant pitting along this bottom strip. These pits may be as deep as 1/8 inch.

(8) As indicated above, the tank valve for Tank No. S-1031 leaked. It s also reported that one other tank valve was known to leak badly. Because of their age, it is expected all the tank valves leak. This may also be the cause of erroneous gage readings due to fuel leaking from one tank into another becasue of differences in static head.

(9) The present location of the truck fill stands are too close to a public road and far too close to the vehicle fueling area. Clearance criterion for truck fill stands from the nearest aboveground storage tank, building, public road, or other fuel loading or dispensing facility is at least 100 feet. One of the truck fill stands is approximately 30 feet from a public road and another is approximately 40 feet from other vehicle dispensing pumps. These clearance violations are considered extremely hazardous. Also, there are no fuel spill containment curbs around the truck fill stands.

(10) There are no fuel spill containment curbs around the truck unloading facility.

(11) The present location of the first row of mogas pumps (four pumps) is approximately 15 feet from the public road. Although there is no prescribed clearance criterion between mogas dispensing pumps and roadways, a distance of 15 feet is considered hazardous. A minimum clearance of 50 feet is recommended.



Doc NO: CLEJ-00231-1.02-8/9/89

c. Recommendations   Mr. Birkhead (Fuel Farm) 5186

~~[illegible]~~

? OIL-Cooling ENGR SVC CONTRACT

(1) Repair the recently installed automatic liquid level indicators as necessary, calibrate and put the system into operation. As noted in paragraph d(5), this work has already been initiated. See Gary Hood (PWC) 600,000 [illegible]

(2) Empty and clean Tank No. S-1009 as soon as practicable. Brush sandblast flat surfaces in accordance with SSPC-SP7. Blast bottom welds to bright metal to permit adequate inspection. Inspect all internal surfaces for pits and all bottom welded seams for discontinuity, porous areas and cracks. Vacuum test all bottom welds and suspect areas on flat bottom surfaces for leaks. Use a vacuum box with a sponge rubber gasket around the bottom edge and a glass top for these tests. Apply a rich soapy film over the weld area to be tested. Place the vacuum box over the spot and pull a partial vacuum of at least three psig. Bubbles can be observed through the glass top wherever leaks occur. Remove the soapy film from the surface with a wet rag after completion of each test. Also, conduct thorough ultrasonic measurements of bottom plates. Record these measurements on a drawing of the tank properly referenced as to location. Readings should be taken on about three-feet centers. Take extra measurements in severely pitted areas and subtract the depth of adjacent pits from the thickness readings.

LE201H PWS WKS DESIGN DIV [illegible] 4 To Contract in 82

(3) Depending on conditions found above, repair and coat the bottom interior of Tank No. S-1009 as follows to prevent further loss of steel, possible leakage, loss of product and environmental contamination: LE201H

(a) If loss of plate thickness is severe, if pitting is severe or if leaks are found, repairs must be made by welding. Repair random pits over 1/8 inch deep by filling with weld metal and grinding off smooth with the surface. Repair areas having more than six pits within a square foot area by covering the area with a new 1/4 inch thick steel cover plate and seal welding all around the plate. Repair defective weld seams showing leaks, surface porosity, cracks or other [illegible] defects by welding as necessary. [illegible] cut and replace plates that are beyond repair.

(b) If corrosion has been minimal, sandblast the tank bottom and up twelve inches onto the tank shell to white metal in accordance with SSPC-SP5 and coat the entire bottom and up twelve inches in accordance with NAVFAC TS-09872. A copy of this guide specification can be furnished upon request.

(c) If the tank bottom has lost substantial amounts of steel due to corrosion, but not over half of the original thickness, sandblast to white metal as indicated above and line the bottom and up twelve inches onto the tank shell with 1/8 inch thick fiberglass reinforced polyester resin. Guide specifications for this lining system can be furnished upon request.

(4) Clean dirt and weeds away from the bottom perimeter on top of the concrete ring foundation all around Tank No. S-1009. Sandblast the entire exterior to a near-white condition in accordance with SSPC-SP10. Coat the entire exterior with one prime coat of inorganic zinc, one bond or tie coat and two finish LE201H

Doc No: CLEJ-00231-1.02 -8/9/89

oats of vinyl paint. Guide specifications for this lining system can be urnished upon request.

(5) Install a new automatic high level alarm completely independent of he gaging system on Tank No. S-1009. It is understood this alarm will be nstalled in this tank and all other storage tanks under the Industrial Waste ollection and Treatment Facilities contract already awarded. P-996 C-41 E-16,17,18

(6) Recalculate the volume of the diked area around Tank No. S-1009. nlarge and reshape the dike so as to provide a volumetric capacity of the nclosure sufficient to retain the greatest volume of fuel that can be released from the tank plus one foot of freeboard. Provide a minimum flat surface of five feet between the tank foundation and the toe of the dike. Dike slopes must be no steeper than one foot vertical to one and one half feet horizontal. Provide a three foot wide flat surface on top of the dike. The inside and top of the dike and the floor of the basin area must be made impervious. Although there are alternative ways to achieve this, it is recommended these surfaces be covered with three inch thick concrete paving reinforced with woven wire fabric. Provide expansion and contraction joints in the concrete as necessary. Slope the floor of the basin to a new drain sump. LE201H

(7) Provide a new six inch steel drain line to outside the dike. Install a new normally closed lock type rising stem gate valve in the drain line side the dike and provide a new concrete valve pit for this valve. Used [illegible] LE201H 7

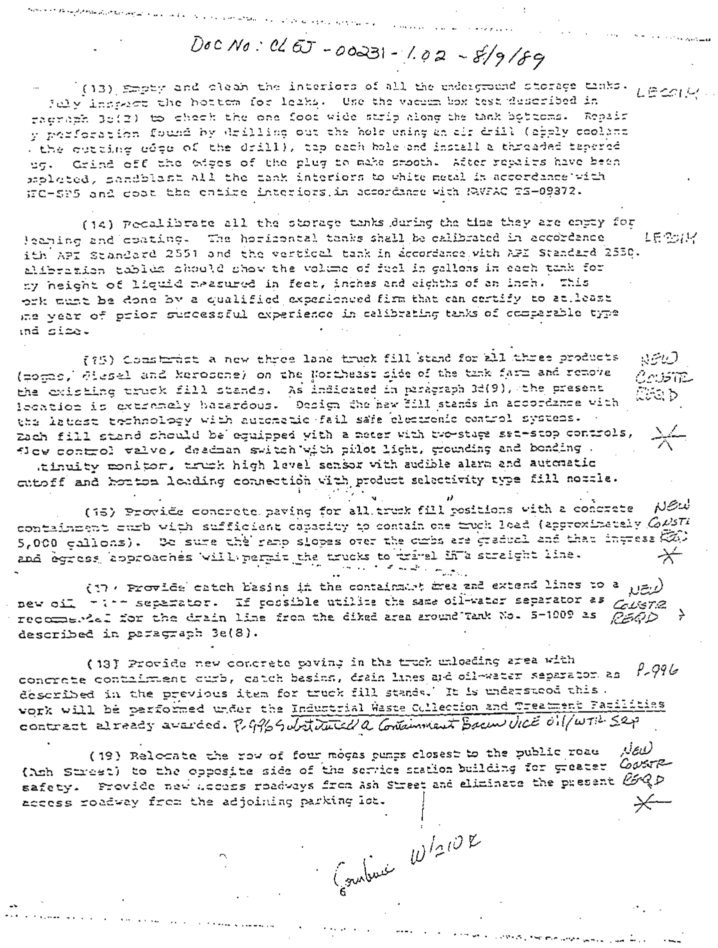
(8) Extend the drain line to outside the fenced area and provide a new concrete two stage gravity-type oil-water separator. Connect the water discharge from the separator to the base sanitary or storm drain system. Run a line for the oil skimmings to a waste tank. Also, provide a bypass with a gate valve to permit drainage of normal water runoff directly into the sanitary or storm drain without passing through the oil-water separator. Dropped from LE201H [illegible] this construct Need a project

(9) Install new pressure-vacuum vents on all existing underground tanks. Vent settings shall be one and one half ounces per square inch for pressure and one half ounce per square inch vacuum. LE201H

(10) Install new automatic high level alarms on all of the underground storage tanks. It is understood these alarms will be installed under the Industrial Waste Collection and Treatment Facilities contract already awarded. P-996

(11) Install new concrete access pits over the manhole covers of all the underground storage tanks. It is understood this work will also be accomplished under the same contract indicated in the previous item. P-996

(12) Relocate and Replace install new piping, new tank valves and new concrete valve pits for all storage tanks. Use double seated block and bleed valves for this service. Recommend use of either ball or non-lubricated plug valves. Redesign and locate piping so as to combine and minimize the number of valve pits required. Also, as far as practicable, locate valve pits outside of mounded area to avoid excessively deep pits. It is essential that all valves be accessible for proper maintenance. LE201H



Doc No: CLEJ - 00231 - 1.02 - 8/9/89

(13) Empty and clean the interiors of all the underground storage tanks. ully inspect the bottom for leaks. Use the vacuum box test described in ragraph 3e(2) to check the one foot wide strip along the tank bottoms. Repair y perforation found by drilling out the hole using an air drill (apply coolant . the cutting edge of the drill), tap each hole and install a threaded tapered ug. Grind off the edges of the plug to make smooth. After repairs have been mpleted, sandblast all the tank interiors to white metal in accordance with SPC-SP5 and coat the entire interiors in accordance with NAVFAC TS-09372. LEGAL

(14) Recalibrate all the storage tanks during the time they are empty for leaning and coating. The horizontal tanks shall be calibrated in accordance ith API Standard 2551 and the vertical tank in accordance with API Standard 2550. alibration tables should show the volume of fuel in gallons in each tank for ny height of liquid measured in feet, inches and eighths of an inch. This ork must be done by a qualified experienced firm that can certify to at least ne year of prior successful experience in calibrating tanks of comparable type nd size. LEGAL

(15) Construct a new three lane truck fill stand for all three products (mogas, diesel and kerosene) on the Northeast side of the tank farm and remove the existing truck fill stands. As indicated in paragraph 3d(9), the present location is extremely hazardous. Design the new fill stands in accordance with the latest technology with automatic fail safe electronic control systems. Each fill stand should be equipped with a meter with two-stage set-stop controls, flow control valve, deadman switch with pilot light, grounding and bonding .tinuity monitor, truck high level sensor with audible alarm and automatic cutoff and bottom loading connection with product selectivity type fill nozzle. NEW CONSTR REQD

(16) Provide concrete paving for all truck fill positions with a concrete containment curb with sufficient capacity to contain one truck load (approximately 5,000 gallons). Be sure the ramp slopes over the curbs are gradual and that ingress and egress approaches will permit the truck to travel in a straight line. NEW CONSTR REQ

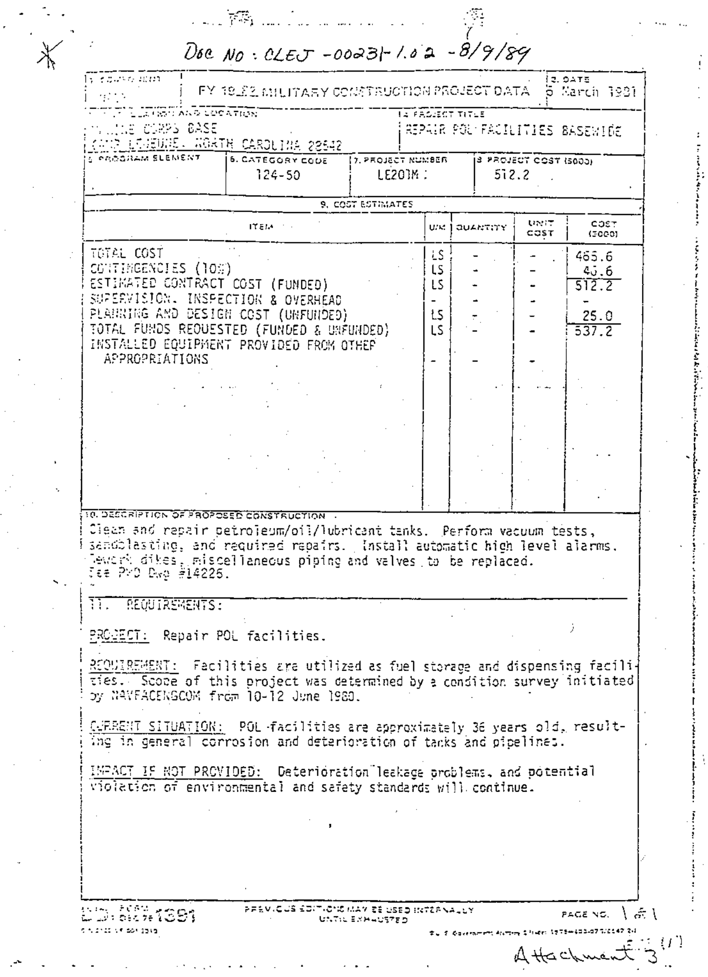
(17) Provide catch basins in the containment area and extend lines to a new oil water separator. If possible utilize the same oil-water separator as recommended for the drain line from the diked area around Tank No. 5-1009 as described in paragraph 3e(8). NEW CONSTR REQD

(18) Provide new concrete paving in the truck unloading area with concrete containment curb, catch basins, drain lines and oil-water separator as described in the previous item for truck fill stands. It is understood this work will be performed under the Industrial Waste Collection and Treatment Facilities contract already awarded. P-996 Substituted a Containment Basin VICE oil/wtr sep P-996

(19) Relocate the row of four mogas pumps closest to the public road (Ash Street) to the opposite side of the service station building for greater safety. Provide new access roadways from Ash Street and eliminate the present access roadway from the adjoining parking lot. NEW CONSTR REQD

Combine W/210R

6



Doc No : CLEJ -00231-1.02 -8/9/89

1. COMPONENT [illegible]

FY 19 82 MILITARY CONSTRUCTION PROJECT DATA

2. DATE 5 March 1981

3. INSTALLATION AND LOCATION
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542

4. PROJECT TITLE
REPAIR POL FACILITIES BASEWIDE

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
	124-50	LE201M	512.2

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
TOTAL COST	LS	-	-	465.6
CONTINGENCIES (10%)	LS	-	-	46.6
ESTIMATED CONTRACT COST (FUNDED)	LS	-	-	512.2
SUPERVISION, INSPECTION & OVERHEAD	-	-	-	-
PLANNING AND DESIGN COST (UNFUNDED)	LS	-	-	25.0
TOTAL FUNDS REQUESTED (FUNDED & UNFUNDED)	LS	-	-	537.2
INSTALLED EQUIPMENT PROVIDED FROM OTHER APPROPRIATIONS	-	-	-	

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Clean and repair petroleum/oil/lubricant tanks. Perform vacuum tests, sandblasting, and required repairs. Install automatic high level alarms. Rework dikes, miscellaneous piping and valves to be replaced.
See PWD Dwg #14225.

11. REQUIREMENTS:

PROJECT: Repair POL facilities.

REQUIREMENT: Facilities are utilized as fuel storage and dispensing facilities. Scope of this project was determined by a condition survey initiated by NAVFACENGCOM from 10-12 June 1980.

CURRENT SITUATION: POL facilities are approximately 36 years old, resulting in general corrosion and deterioration of tanks and pipelines.

IMPACT IF NOT PROVIDED: Deterioration leakage problems, and potential violation of environmental and safety standards will continue.

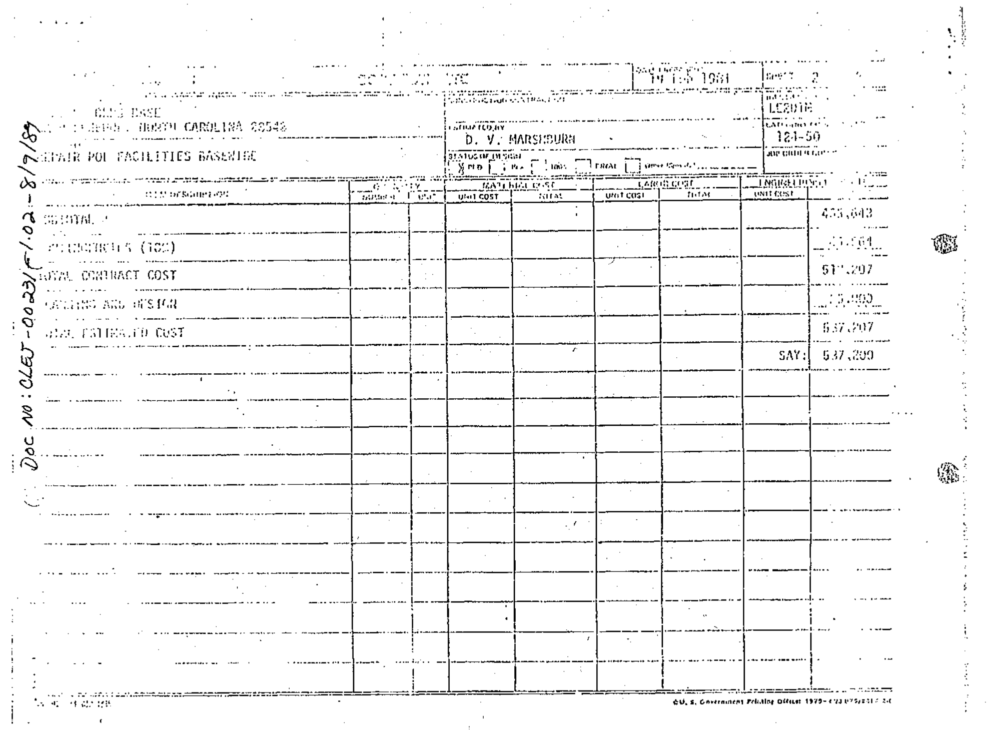
DD FORM 1 DEC 76 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO. 1 of 1

Attachment 3

Doc No: CLEJ-00231-1.02 - 8/9/89

CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542				DATE PREPARED 15 JAN 1981		SHEET 1		
REPAIR POL FACILITIES BASEWIDE			ESTIMATED BY D. V. MARSHBURN STATUS OF DESIGN ☒ PFD ☐ 30% ☐ 90% ☐ FINAL ☐			LE2071 124-50		
DESCRIPTION	QUANTITY	UNIT	MATERIAL COST UNIT COST	MATERIAL COST TOTAL	LABOR COST UNIT COST	LABOR COST TOTAL	ENGINEERING UNIT COST	TOTAL
CLEAN AND TEST TANK NO. S-1009	1	LS						7,200
REPAIR TANK S-1009	1	LS						64,400
REPAIR EXTERIOR OF TANK NO. S-1009	1	LS						7,200
ENLARGE DIKE	1	LS						61,100
REPLACE DRAIN FROM DIKE	1	LS						3,600
REMOVE EXISTING AND REPLACE PRESSURE PUMPS	1	LS						6,000
REMOVE EXISTING AND REPLACE PIPING VALVES								
AND CONCRETE	1	LS						132,200
CLEAN AND TEST UNDERGROUND TANKS	1	LS						33,600
REHABILITATE UNDERGROUND TANKS	1	LS						10,000
SUBTOTAL								342,960
OVERHEAD (15%)								51,447
TAXES, INS., S.S. (12% OF LABOR)								24,694
SUBTOTAL								419,121
PROFIT (10%)								41,912
SUBTOTAL								461,033
BOND (1.0%)								4,610

U.S. Government Printing Office 1979



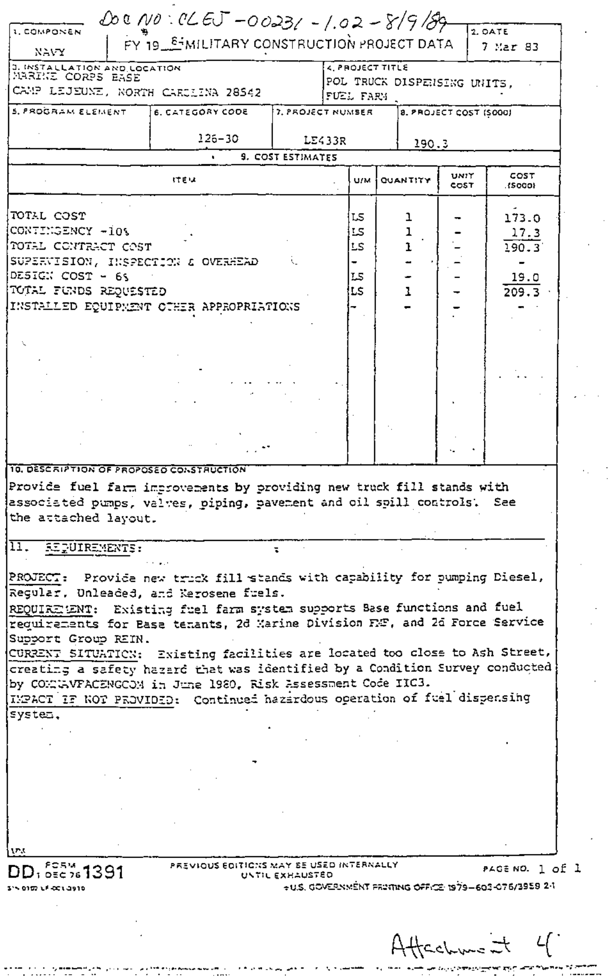
[illegible] BASE
[illegible], NORTH CAROLINA 28542
REPAIR POL FACILITIES BASEWIDE

DATE PREPARED 19 [illegible] 1981
SHEET 2
LE201R
CATEGORY CODE 121-50
JOB ORDER NO.
ESTIMATED BY D. V. MARSHBURN
STATUS OF DESIGN ☒ PED ☐ [illegible] ☐ 100% ☐ FINAL ☐ OTHER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
SUBTOTAL								455,643
CONTINGENCIES ([illegible])								61,564
TOTAL CONTRACT COST								517,207
[illegible] AND DESIGN								20,000
TOTAL ESTIMATED COST								537,207
							SAY:	537,200

U.S. Government Printing Office 1979-[illegible]

Doc No: OLEJ-00231/F1.02-8/7/89



Doc NO: CLEJ-00231-1.02-8/9/89

1. COMPONENT NAVY	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE 7 Mar 83

3. INSTALLATION AND LOCATION MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542	4. PROJECT TITLE POL TRUCK DISPENSING UNITS, FUEL FARM

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
	126-30	LE433R	190.3

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
TOTAL COST	LS	1	-	173.0
CONTINGENCY -10%	LS	1	-	17.3
TOTAL CONTRACT COST	LS	1	-	190.3
SUPERVISION, INSPECTION & OVERHEAD	-	-	-	-
DESIGN COST - 6%	LS	-	-	19.0
TOTAL FUNDS REQUESTED	LS	1	-	209.3
INSTALLED EQUIPMENT OTHER APPROPRIATIONS	-	-	-	-

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Provide fuel farm improvements by providing new truck fill stands with associated pumps, valves, piping, pavement and oil spill controls. See the attached layout.

11. REQUIREMENTS:

PROJECT: Provide new truck fill stands with capability for pumping Diesel, Regular, Unleaded, and Kerosene fuels.

REQUIREMENT: Existing fuel farm system supports Base functions and fuel requirements for Base tenants, 2d Marine Division FMF, and 2d Force Service Support Group REIN.

CURRENT SITUATION: Existing facilities are located too close to Ash Street, creating a safety hazard that was identified by a Condition Survey conducted by COMNAVFACENGCOM in June 1980, Risk Assessment Code IIC3.

IMPACT IF NOT PROVIDED: Continued hazardous operation of fuel dispensing system.

DD FORM 1 DEC 76 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO. 1 of 1

S/N 0102-LF-001-3910 ☆U.S. GOVERNMENT PRINTING OFFICE: 1979—603-076/3959 2-1

Attachment 4

NAVFAC 11013/7 (1-78)
Supersedes NAVDOCKS 2417 and 2417A

COST ESTIMATE

DATE PREPARED: 7 Mar 83
SHEET 1 OF 1

ACTIVITY AND LOCATION: MARINE CORPS BASE, CAMP LEJEUNE, NC 28542
CONSTRUCTION CONTRACT NO.:
IDENTIFICATION NUMBER: LE433R
ESTIMATED BY: V. MARSHBURN
CATEGORY CODE NUMBER: 126-30
PROJECT TITLE: POL TURCK DISPENSING UNITS, FUEL FARM
STATUS OF DESIGN: ☐ PED ☐ 30% ☐ 100% ☐ FINAL ☒ Other (Specify) Project
JOB ORDER NUMBER:

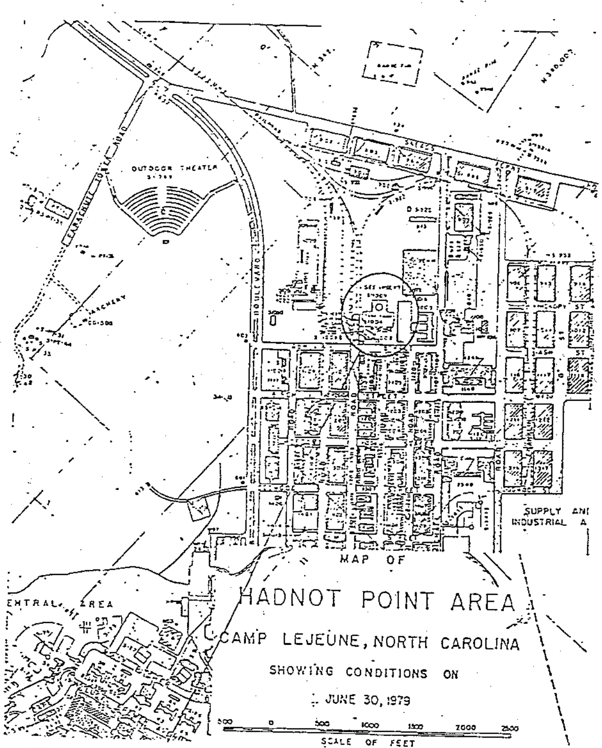
ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
EXTEND CULVERT	200	LF	25	5,000	20	4,000		9,000
ASPHALT PAVING	3,000	SY	10.00	30,000	5.00	15,000		45,000
TRUCK FILL STANDS w/ATTENDANTS BOOTH	2	EA	10,000	20,000	5,000	10,000		30,000
PIPING, VALVES, METERS, PUMPS	1	LS	25,000	25,000	10,000	10,000		35,000
OIL SPILL CONTROL	1	LS	5,000	5,000	1,500	1,500		6,500
SUBTOTAL				85,000		40,500		125,500
OVERHEAD - 15%								18,825
TAXES, INS., S.S. 18% OF LABOR								7,290
SALES TAX 4% OF MATERIAL								3,400
SUBTOTAL								155,015
PROFIT - 10%								15,501
SUBTOTAL								170,516
BOND - 1.5%								2,557
SUBTOTAL								173,073
							SAY	173,000

Doc No: CLEJ: 00231 - 1.02 - 8/9/89

S/N 0105-LF-010-3355

U.S. GOVERNMENT PRINTING OFFICE: [illegible]

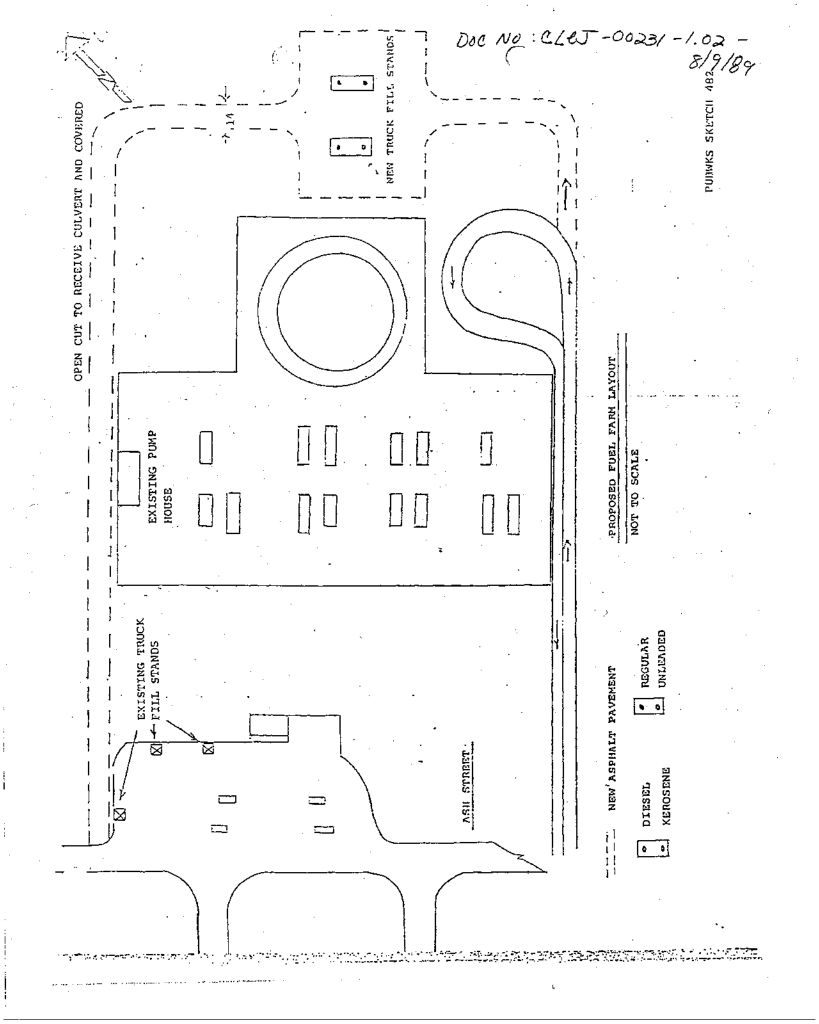
Doc No: CLEJ-00231-1.02-
8/9/89

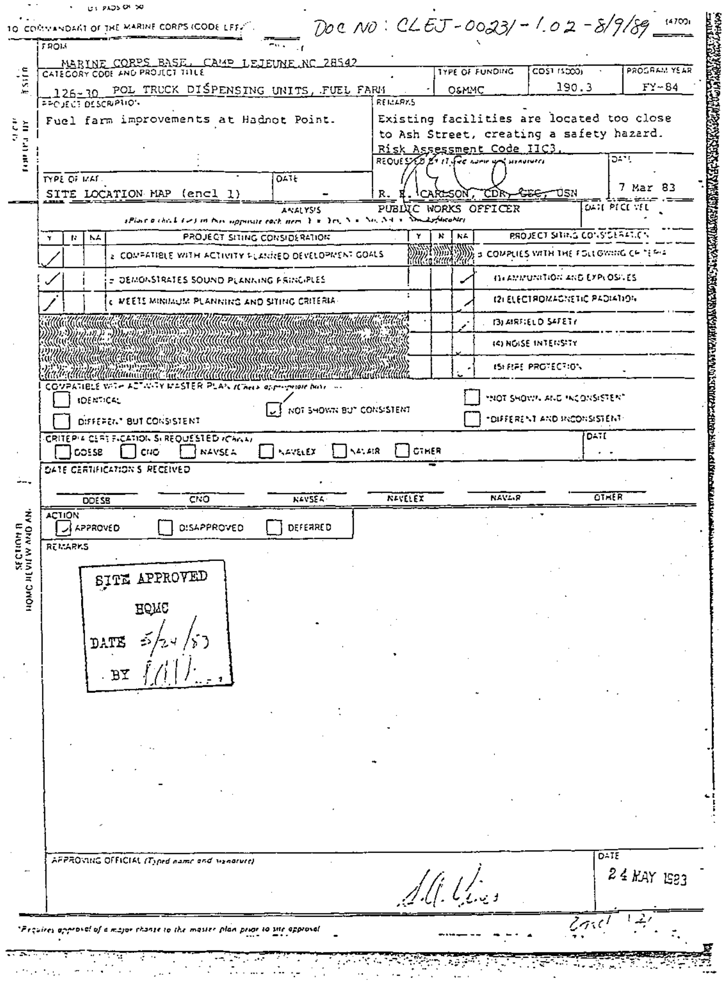


SITE LOCATION MAP

RELOCATE POL TRUCK DISPENSING -
UNITS, FUEL FARM

ENCL (1)


Doc No: CLeJ-00231-1.02-8/9/89
PUBWKS SKETCH 482
OPEN CUT TO RECEIVE CULVERT AND COVERED
14'
NEW TRUCK FILL STANDS
EXISTING PUMP HOUSE
EXISTING TRUCK FILL STANDS
ASH STREET
PROPOSED FUEL FARM LAYOUT
NOT TO SCALE
NEW ASPHALT PAVEMENT
DIESEL
KEROSENE
REGULAR
UNLEADED



PADS OF 50

TO COMMANDANT OF THE MARINE CORPS (CODE LFF) Doc No: CLEJ-00231-1.02-8/9/89 (4700)

FROM
MARINE CORPS BASE, CAMP LEJEUNE, NC 28542

CATEGORY CODE AND PROJECT TITLE 126-30 POL TRUCK DISPENSING UNITS, FUEL FARM	TYPE OF FUNDING O&MMC	COST ($000) 190.3	PROGRAM YEAR FY-84

PROJECT DESCRIPTION
Fuel farm improvements at Hadnot Point.

REMARKS
Existing facilities are located too close to Ash Street, creating a safety hazard. Risk Assessment Code IIC3.

TYPE OF MAP: SITE LOCATION MAP (encl 1)
DATE: -

REQUESTED BY (Typed name and signature): R. E. CARLSON, CDR, ~~CEC~~, USN
PUBLIC WORKS OFFICER
DATE: 7 Mar 83

DATE RECEIVED

ANALYSIS
(Place a check (✓) in box opposite each item Y = Yes, N = No, NA = Not Applicable)

Y	N	NA	PROJECT SITING CONSIDERATION	Y	N	NA	PROJECT SITING CONSIDERATION
✓			a. COMPATIBLE WITH ACTIVITY PLANNED DEVELOPMENT GOALS				d. COMPLIES WITH THE FOLLOWING CRITERIA
✓			b. DEMONSTRATES SOUND PLANNING PRINCIPLES			✓	(1) AMMUNITION AND EXPLOSIVES
✓			c. MEETS MINIMUM PLANNING AND SITING CRITERIA			✓	(2) ELECTROMAGNETIC RADIATION
						✓	(3) AIRFIELD SAFETY
						✓	(4) NOISE INTENSITY
						✓	(5) FIRE PROTECTION

COMPATIBLE WITH ACTIVITY MASTER PLAN (Check appropriate box)
☐ IDENTICAL
☐ DIFFERENT BUT CONSISTENT
☑ NOT SHOWN BUT CONSISTENT
☐ *NOT SHOWN AND INCONSISTENT
☐ *DIFFERENT AND INCONSISTENT

CRITERIA CERTIFICATION(S) REQUESTED (Check)
☐ DDESB ☐ CNO ☐ NAVSEA ☐ NAVELEX ☐ NAVAIR ☐ OTHER
DATE

DATE CERTIFICATION(S) RECEIVED
DDESB ____ CNO ____ NAVSEA ____ NAVELEX ____ NAVAIR ____ OTHER ____

SECTION II
HQMC REVIEW AND AN-

ACTION
☑ APPROVED ☐ DISAPPROVED ☐ DEFERRED

REMARKS

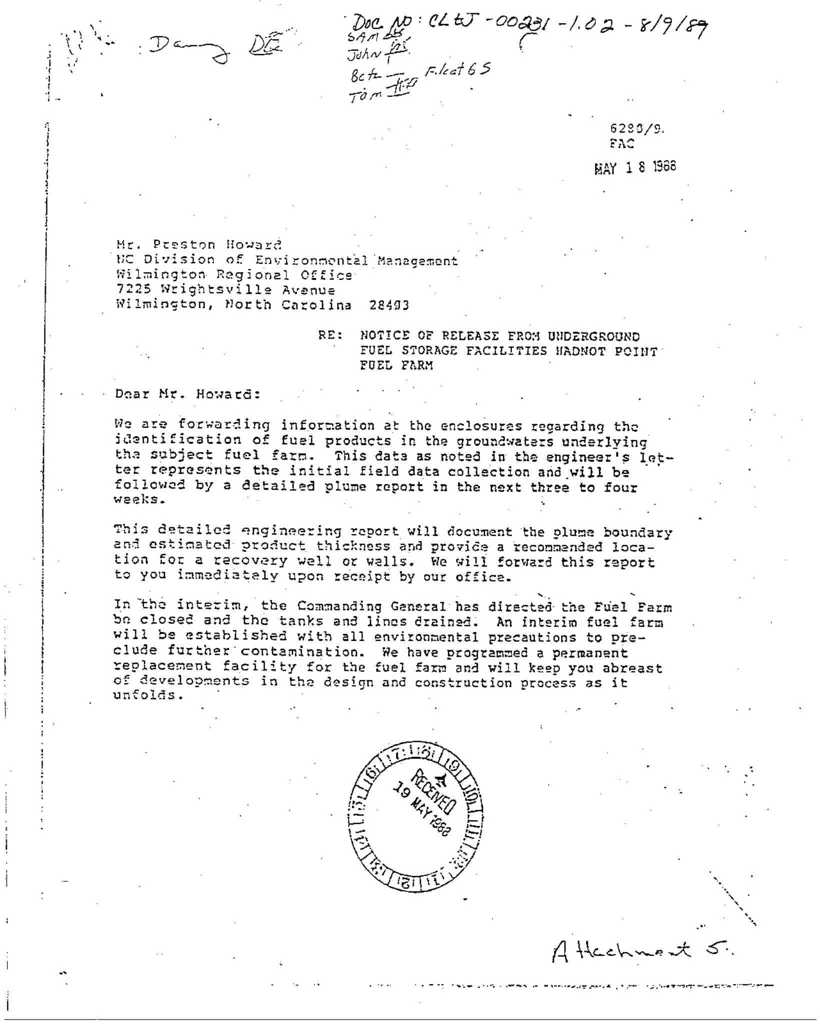
SITE APPROVED
HQMC
DATE 5/24/83
BY

APPROVING OFFICIAL (Typed name and signature)

DATE
24 MAY 1983

*Requires approval of a major change to the master plan prior to site approval

Encl (2)



Danny DE

Doc NO: CLW-00231-1.02-8/9/89
SAM
John
Betz
Tom
File at 6S

6280/9.
FAC
MAY 1 8 1988

Mr. Preston Howard
NC Division of Environmental Management
Wilmington Regional Office
7225 Wrightsville Avenue
Wilmington, North Carolina 28403

RE: NOTICE OF RELEASE FROM UNDERGROUND
FUEL STORAGE FACILITIES HADNOT POINT
FUEL FARM

Dear Mr. Howard:

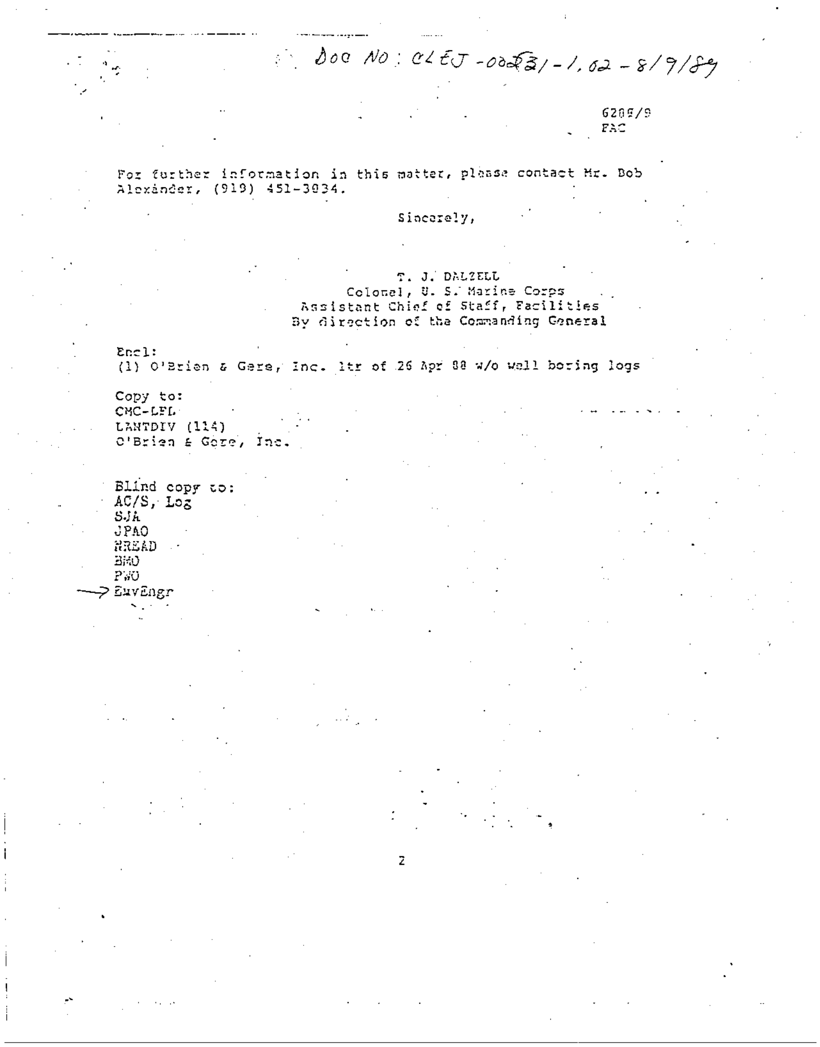
We are forwarding information at the enclosures regarding the identification of fuel products in the groundwaters underlying the subject fuel farm. This data as noted in the engineer's letter represents the initial field data collection and will be followed by a detailed plume report in the next three to four weeks.

This detailed engineering report will document the plume boundary and estimated product thickness and provide a recommended location for a recovery well or wells. We will forward this report to you immediately upon receipt by our office.

In the interim, the Commanding General has directed the Fuel Farm be closed and the tanks and lines drained. An interim fuel farm will be established with all environmental precautions to preclude further contamination. We have programmed a permanent replacement facility for the fuel farm and will keep you abreast of developments in the design and construction process as it unfolds.

RECEIVED
19 MAY 1988

Attachment 5.



DOC NO: CLEJ-00231-1.02-8/9/89

6280/9
FAC

For further information in this matter, please contact Mr. Bob Alexander, (919) 451-3034.

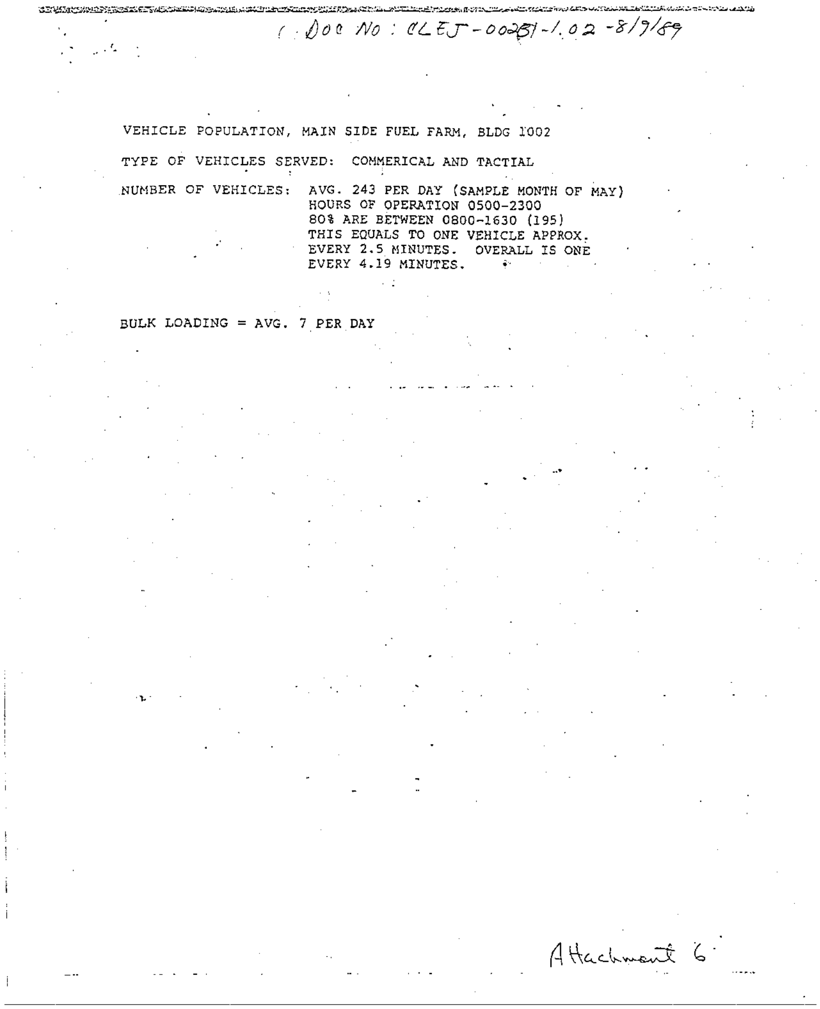
Sincerely,

T. J. DALZELL
Colonel, U. S. Marine Corps
Assistant Chief of Staff, Facilities
By direction of the Commanding General

Encl:
(1) O'Brien & Gere, Inc. ltr of 26 Apr 88 w/o well boring logs

Copy to:
CMC-LFL
LANTDIV (114)
O'Brien & Gere, Inc.

Blind copy to:
AC/S, Log
SJA
JPAO
NREAD
BMO
PWO
→ EnvEngr



Doc No: CLEJ-00281-1.02-8/9/89

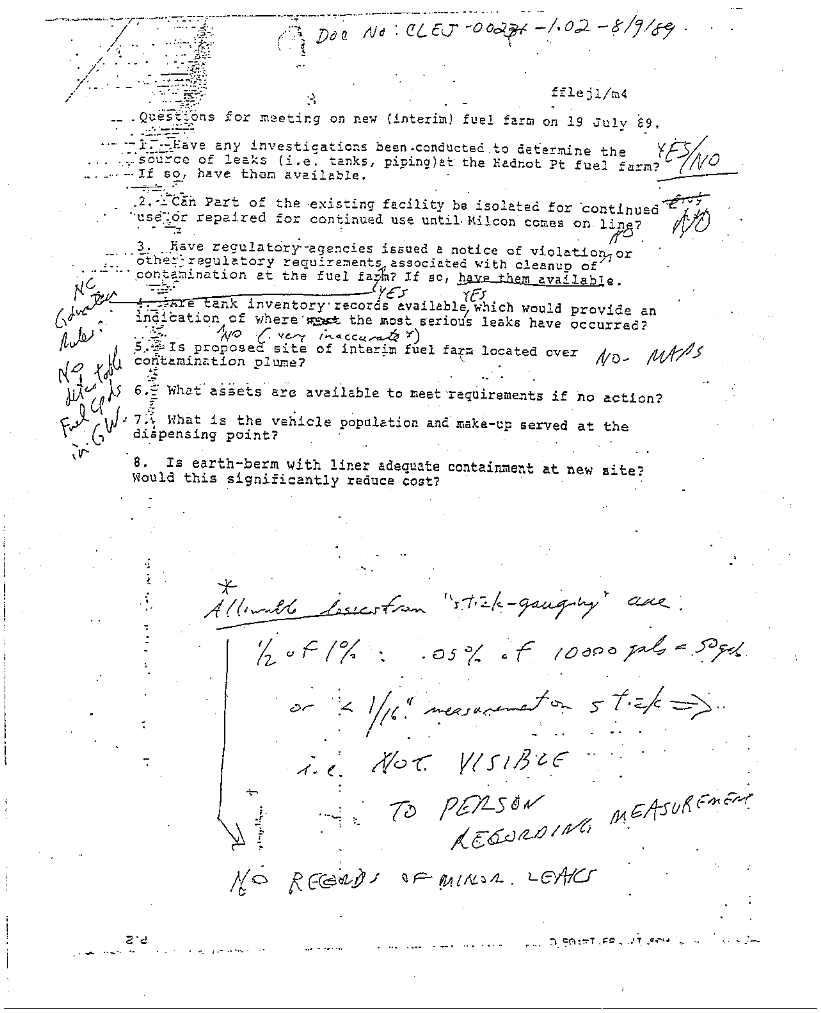
VEHICLE POPULATION, MAIN SIDE FUEL FARM, BLDG 1002

TYPE OF VEHICLES SERVED: COMMERICAL AND TACTIAL

NUMBER OF VEHICLES: AVG. 243 PER DAY (SAMPLE MONTH OF MAY)
HOURS OF OPERATION 0500-2300
80% ARE BETWEEN 0800-1630 (195)
THIS EQUALS TO ONE VEHICLE APPROX.
EVERY 2.5 MINUTES. OVERALL IS ONE
EVERY 4.19 MINUTES.

BULK LOADING = AVG. 7 PER DAY

Attachment 6



Doc No: CLEJ-00231-1.02-8/9/89

fflejl/m4

Questions for meeting on new (interim) fuel farm on 19 July 89.

1. Have any investigations been conducted to determine the source of leaks (i.e. tanks, piping) at the Hadnot Pt fuel farm? If so, have them available. YES/NO

2. Can Part of the existing facility be isolated for continued use or repaired for continued use until Milcon comes on line? ~~YES~~ NO

3. Have regulatory agencies issued a notice of violation, or other regulatory requirements, associated with cleanup of contamination at the fuel farm? If so, have them available. NO

NC Gdwater Rule: No detectable Fuel Cpds in GW.

4. Are tank inventory records available, which would provide an indication of where ~~most~~ the most serious leaks have occurred? YES YES NO (very inaccurate*)

5. Is proposed site of interim fuel farm located over contamination plume? NO - MAPS

6. What assets are available to meet requirements if no action?

7. What is the vehicle population and make-up served at the dispensing point?

8. Is earth-berm with liner adequate containment at new site? Would this significantly reduce cost?

* Allowable losses from "stick-gauging" are:

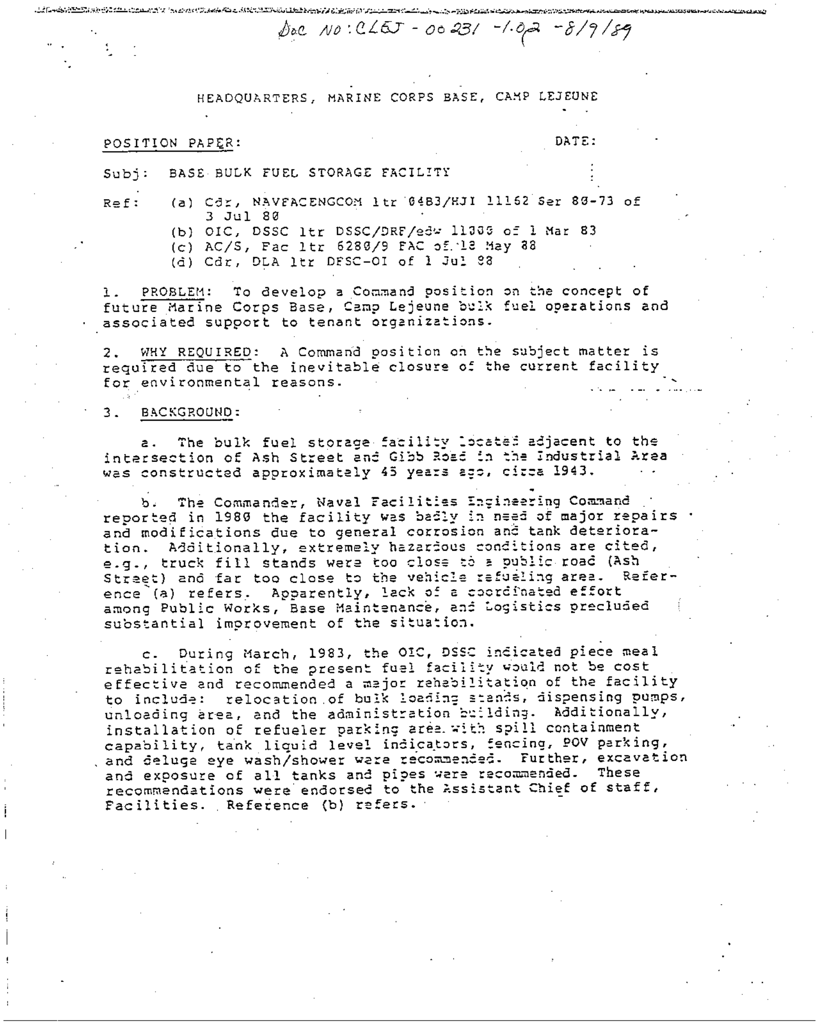
½ of 1% : .05% of 10000 gals = 50 gals

or < 1/16" measurement on stick ⇒

i.e. NOT VISIBLE

TO PERSON RECORDING MEASUREMENT

NO RECORDS OF MINOR LEAKS



Doc No: CLEJ - 00231 - 1.02 - 8/9/89

HEADQUARTERS, MARINE CORPS BASE, CAMP LEJEUNE

POSITION PAPER: DATE:

Subj: BASE BULK FUEL STORAGE FACILITY

Ref: (a) Cdr, NAVFACENGCOM ltr 04B3/HJI 11162 Ser 80-73 of 3 Jul 80
(b) OIC, DSSC ltr DSSC/DRF/edw 11000 of 1 Mar 83
(c) AC/S, Fac ltr 6280/9 FAC of 18 May 88
(d) Cdr, DLA ltr DFSC-OI of 1 Jul 88

1. PROBLEM: To develop a Command position on the concept of future Marine Corps Base, Camp Lejeune bulk fuel operations and associated support to tenant organizations.

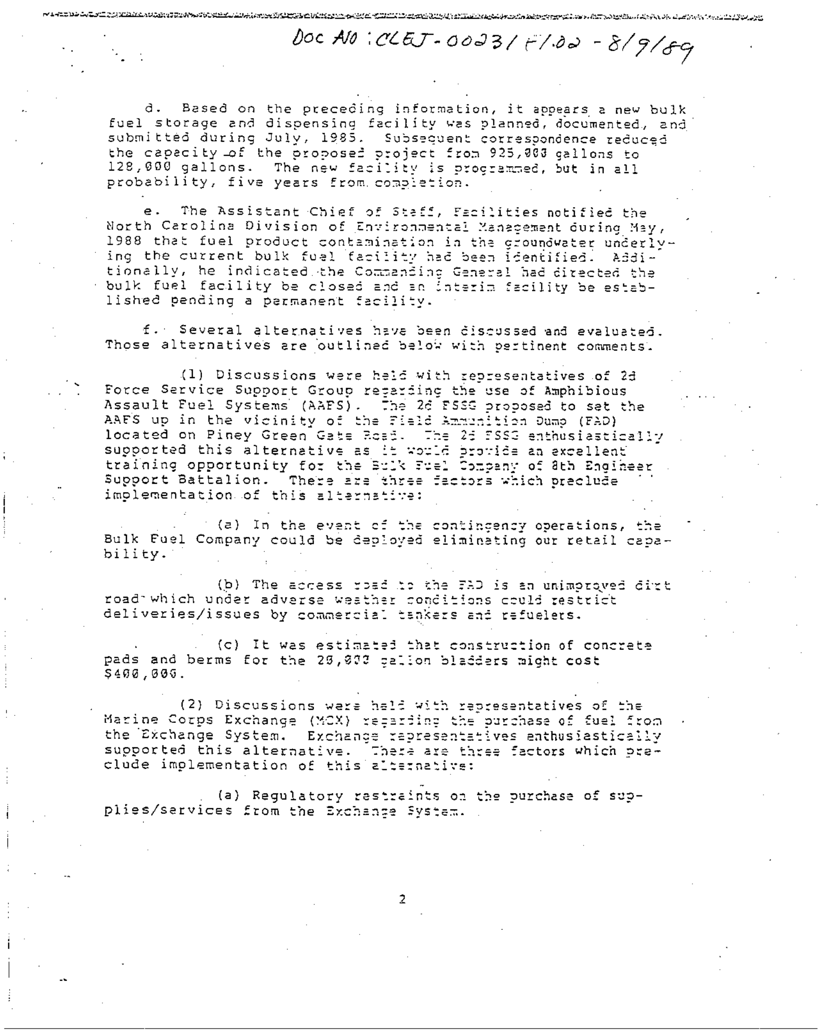
2. WHY REQUIRED: A Command position on the subject matter is required due to the inevitable closure of the current facility for environmental reasons.

3. BACKGROUND:

a. The bulk fuel storage facility located adjacent to the intersection of Ash Street and Gibb Road in the Industrial Area was constructed approximately 45 years ago, circa 1943.

b. The Commander, Naval Facilities Engineering Command reported in 1980 the facility was badly in need of major repairs and modifications due to general corrosion and tank deterioration. Additionally, extremely hazardous conditions are cited, e.g., truck fill stands were too close to a public road (Ash Street) and far too close to the vehicle refueling area. Reference (a) refers. Apparently, lack of a coordinated effort among Public Works, Base Maintenance, and Logistics precluded substantial improvement of the situation.

c. During March, 1983, the OIC, DSSC indicated piece meal rehabilitation of the present fuel facility would not be cost effective and recommended a major rehabilitation of the facility to include: relocation of bulk loading stands, dispensing pumps, unloading area, and the administration building. Additionally, installation of refueler parking area with spill containment capability, tank liquid level indicators, fencing, POV parking, and deluge eye wash/shower were recommended. Further, excavation and exposure of all tanks and pipes were recommended. These recommendations were endorsed to the Assistant Chief of staff, Facilities. Reference (b) refers.



DOC NO: CLEJ-00231 F1.02 - 8/9/89

d. Based on the preceding information, it appears a new bulk fuel storage and dispensing facility was planned, documented, and submitted during July, 1985. Subsequent correspondence reduced the capacity of the proposed project from 925,000 gallons to 128,000 gallons. The new facility is programmed, but in all probability, five years from completion.

e. The Assistant Chief of Staff, Facilities notified the North Carolina Division of Environmental Management during May, 1988 that fuel product contamination in the groundwater underlying the current bulk fuel facility had been identified. Additionally, he indicated the Commanding General had directed the bulk fuel facility be closed and an interim facility be established pending a permanent facility.

f. Several alternatives have been discussed and evaluated. Those alternatives are outlined below with pertinent comments.

(1) Discussions were held with representatives of 2d Force Service Support Group regarding the use of Amphibious Assault Fuel Systems (AAFS). The 2d FSSG proposed to set the AAFS up in the vicinity of the Field Ammunition Dump (FAD) located on Piney Green Gate Road. The 2d FSSG enthusiastically supported this alternative as it would provide an excellent training opportunity for the Bulk Fuel Company of 8th Engineer Support Battalion. There are three factors which preclude implementation of this alternative:

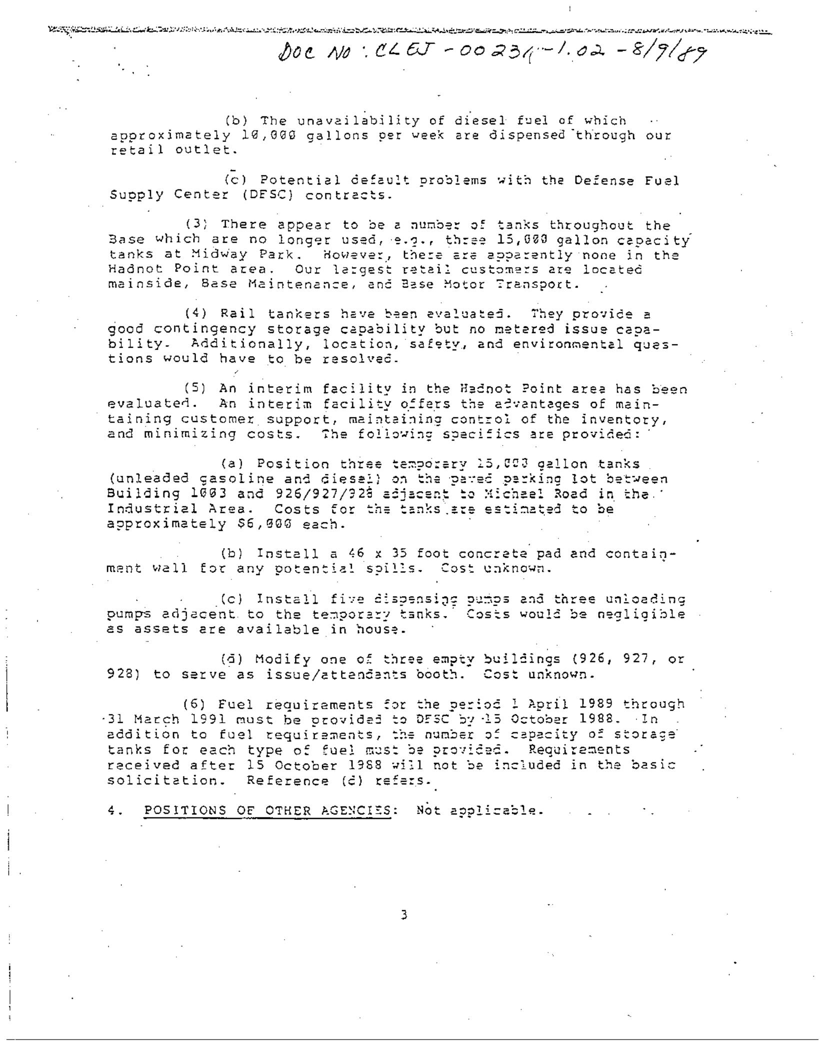
(a) In the event of the contingency operations, the Bulk Fuel Company could be deployed eliminating our retail capability.

(b) The access road to the FAD is an unimproved dirt road which under adverse weather conditions could restrict deliveries/issues by commercial tankers and refuelers.

(c) It was estimated that construction of concrete pads and berms for the 20,000 gallon bladders might cost $400,000.

(2) Discussions were held with representatives of the Marine Corps Exchange (MCX) regarding the purchase of fuel from the Exchange System. Exchange representatives enthusiastically supported this alternative. There are three factors which preclude implementation of this alternative:

(a) Regulatory restraints on the purchase of supplies/services from the Exchange System.



DOC NO: CLEJ-00231-1.02-8/9/89

(b) The unavailability of diesel fuel of which approximately 10,000 gallons per week are dispensed through our retail outlet.

(c) Potential default problems with the Defense Fuel Supply Center (DFSC) contracts.

(3) There appear to be a number of tanks throughout the Base which are no longer used, e.g., three 15,000 gallon capacity tanks at Midway Park. However, there are apparently none in the Hadnot Point area. Our largest retail customers are located mainside, Base Maintenance, and Base Motor Transport.

(4) Rail tankers have been evaluated. They provide a good contingency storage capability but no metered issue capability. Additionally, location, safety, and environmental questions would have to be resolved.

(5) An interim facility in the Hadnot Point area has been evaluated. An interim facility offers the advantages of maintaining customer support, maintaining control of the inventory, and minimizing costs. The following specifics are provided:

(a) Position three temporary 15,000 gallon tanks (unleaded gasoline and diesel) on the paved parking lot between Building 1003 and 926/927/928 adjacent to Michael Road in the Industrial Area. Costs for the tanks are estimated to be approximately $6,000 each.

(b) Install a 46 x 35 foot concrete pad and containment wall for any potential spills. Cost unknown.

(c) Install five dispensing pumps and three unloading pumps adjacent to the temporary tanks. Costs would be negligible as assets are available in house.

(d) Modify one of three empty buildings (926, 927, or 928) to serve as issue/attendants booth. Cost unknown.

(6) Fuel requirements for the period 1 April 1989 through 31 March 1991 must be provided to DFSC by 15 October 1988. In addition to fuel requirements, the number of capacity of storage tanks for each type of fuel must be provided. Requirements received after 15 October 1988 will not be included in the basic solicitation. Reference (d) refers.

4. POSITIONS OF OTHER AGENCIES: Not applicable.

Doc No: CLEJ-00231 T 1.02 - 8/9/89

5. RECOMMENDED MARINE CORPS BASE POSITION: That a combination of an interim retail facility and utilization of abandoned storage tanks be adopted as the approved plan to provide fuel support until the replacement facility is completed.

6. RATIONALE: The recommended position facilitates continued retail support. It provides for approximately 45,000 gallon backup capacity at Midway Park. Additionally, the proposed position ensures appropriate inventory controls and accountability are maintained. The position allows us to initiate implementation planning in order to close the current facility as rapidly as possible. Finally, the proposed position allows us to meet Defense Logistics Agency (DLA) deadlines for requirements submission which ensures uninterrupted support and the lowest possible price. The plan has been tentatively concurred in by Assistant Chief of Staff, Facilities and Logistics.

7. RECOMMENDATIONS:

a. Approve the immediate planning and construction of an interim retail fuel facility on the parking lot between Buildings 1003 and 926/927/928.

	APPROVED	DISAPPROVED
Commanding General	________	________

b. Approve the use of three 15,000 gallon capacity fuel storage tanks located at Midway Park as an interim backup gasoline and diesel bulk storage facility.

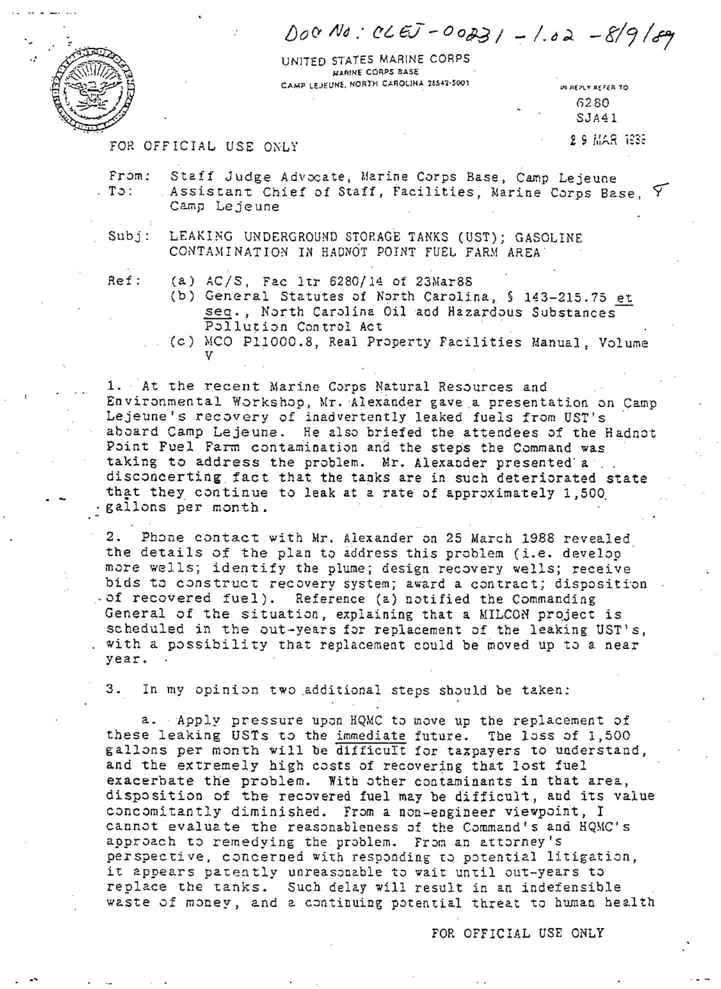
	APPROVED	DISAPPROVED
Commanding General	________	________

c. Approve immediate action on all issues related to this initiative in order to commence operations from the interim facility by 1 January 1989.

	APPROVED	DISAPPROVED
Commanding General	________	________

d. Approve the use of priorities commensurate with the urgency of this initiative to ensure all actions are complete by 1 January 1989.

	APPROVED	DISAPPROVED
Commanding General	________	________



Doc No: CLEJ-00231-1.02-8/9/89

UNITED STATES MARINE CORPS
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542-5001

IN REPLY REFER TO
6280
SJA41
29 MAR 1988

FOR OFFICIAL USE ONLY

From: Staff Judge Advocate, Marine Corps Base, Camp Lejeune
To: Assistant Chief of Staff, Facilities, Marine Corps Base, Camp Lejeune

Subj: LEAKING UNDERGROUND STORAGE TANKS (UST); GASOLINE CONTAMINATION IN HADNOT POINT FUEL FARM AREA

Ref: (a) AC/S, Fac ltr 6280/14 of 23Mar88
(b) General Statutes of North Carolina, § 143-215.75 *et seq.*, North Carolina Oil and Hazardous Substances Pollution Control Act
(c) MCO P11000.8, Real Property Facilities Manual, Volume V

1. At the recent Marine Corps Natural Resources and Environmental Workshop, Mr. Alexander gave a presentation on Camp Lejeune's recovery of inadvertently leaked fuels from UST's aboard Camp Lejeune. He also briefed the attendees of the Hadnot Point Fuel Farm contamination and the steps the Command was taking to address the problem. Mr. Alexander presented a disconcerting fact that the tanks are in such deteriorated state that they continue to leak at a rate of approximately 1,500 gallons per month.

2. Phone contact with Mr. Alexander on 25 March 1988 revealed the details of the plan to address this problem (i.e. develop more wells; identify the plume; design recovery wells; receive bids to construct recovery system; award a contract; disposition of recovered fuel). Reference (a) notified the Commanding General of the situation, explaining that a MILCON project is scheduled in the out-years for replacement of the leaking UST's, with a possibility that replacement could be moved up to a near year.

3. In my opinion two additional steps should be taken:

a. Apply pressure upon HQMC to move up the replacement of these leaking USTs to the immediate future. The loss of 1,500 gallons per month will be difficult for taxpayers to understand, and the extremely high costs of recovering that lost fuel exacerbate the problem. With other contaminants in that area, disposition of the recovered fuel may be difficult, and its value concomitantly diminished. From a non-engineer viewpoint, I cannot evaluate the reasonableness of the Command's and HQMC's approach to remedying the problem. From an attorney's perspective, concerned with responding to potential litigation, it appears patently unreasonable to wait until out-years to replace the tanks. Such delay will result in an indefensible waste of money, and a continuing potential threat to human health

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and the environment. Formally applying to HQMC for expedited action will assist in demonstrating to the public and the residents of Camp Lejeune that the Command took swift, reasonable action.

b. Notify the North Carolina Department of Environmental Management (Department of NRCD). Reference (b) explicitly excepts discharges of oil caused by the United States government into lands of North Carolina from being "unlawful" discharges. However, reference (b) does require notice of such a discharge, even though it is not unlawful. Section 143.215.85 provides:

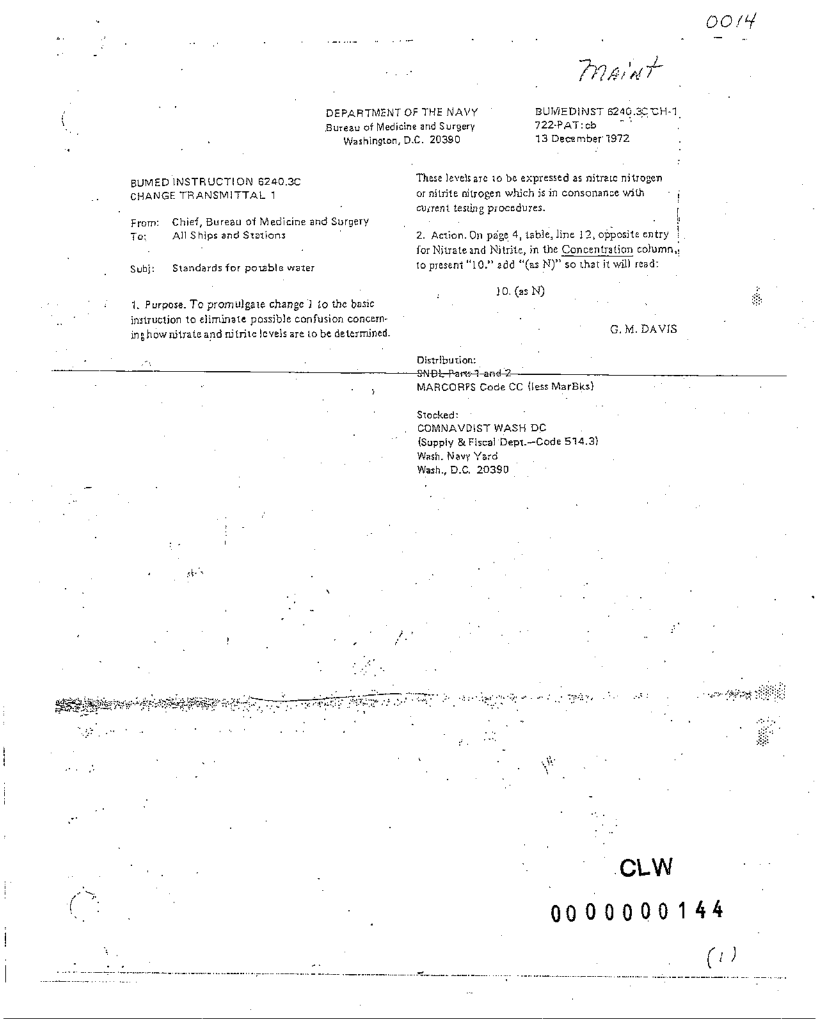
> Every person owning or having control over oil or other substances discharged in any circumstances other than pursuant to existing regulation of the Environmental Management Commission or the U.S. Environmental Protection Agency or pursuant to a permit required by G.S. 143-215.1 or the Federal Water Pollution Control Act, upon notice that such discharge has occurred, shall immediately notify the Department...of the nature, location and time of the discharge and of the measures which are being taken to contain and remove the discharge.

"Person" as used above is defined in § 143.215.77(13): "...any and all natural persons, firms, partnership, associations, public or private institutions, municipalities or political subdivisions, governmental agencies...." (Emphasis added). Additionally, paragraph 4103.1 of reference (c) states: "...Marine Corps activities shall comply with the requirements of Federal, State, and local environmental laws and regulations and demonstrate leadership in pollution abatement and environmental enhancement."

Not only is such notice required by law and regulation, but prudence also dictates such action. The Base will soon be organizing the Technical Review Committee for the CERCLA (SARA) NPL cleanup, and the nature of the Hadnot Point groundwater contamination will be fully explained to the members. Naturally, they will be concerned about the steps the Base is taking to stop further contamination, and State officials in particular will want to know why they were not advised earlier. Providing notification to the State now will ensure the Base establishes its credibility as an open, frank, totally-candid player in the NPL cleanup process--which is a crucial objective in the NPL cleanup process.

4. I offer my Office's assistance to you in tackling this sensitive issue.

A. P. Tokarz
A. P. TOKARZ



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Maint

DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington, D.C. 20390

BUMEDINST 6240.3C CH-1
722-PAT:cb
13 December 1972

BUMED INSTRUCTION 6240.3C
CHANGE TRANSMITTAL 1

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Standards for potable water

1. *Purpose.* To promulgate change 1 to the basic instruction to eliminate possible confusion concerning how nitrate and nitrite levels are to be determined. These levels are to be expressed as nitrate nitrogen or nitrite nitrogen which is in consonance with current testing procedures.

2. Action. On page 4, table, line 12, opposite entry for Nitrate and Nitrite, in the Concentration column, to present "10." add "(as N)" so that it will read:

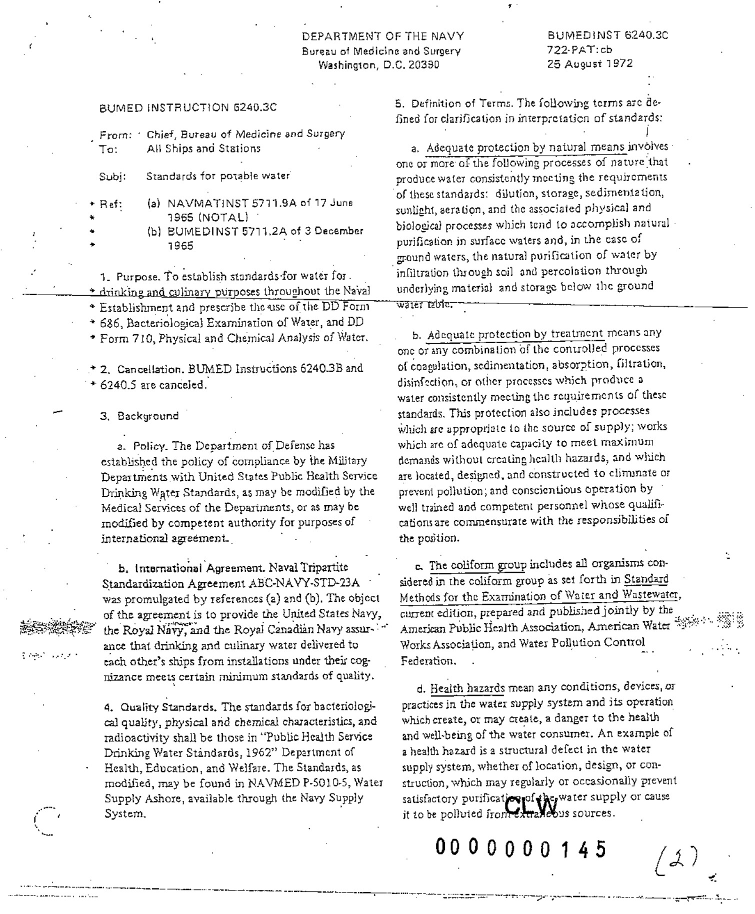
10. (as N)

G. M. DAVIS

Distribution:
~~SNDL Parts 1 and 2~~
MARCORPS Code CC (less MarBks)

Stocked:
COMNAVDIST WASH DC
(Supply & Fiscal Dept.—Code 514.3)
Wash. Navy Yard
Wash., D.C. 20390

(1)



DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington, D.C. 20390

BUMEDINST 6240.3C
722-PAT:cb
25 August 1972

BUMED INSTRUCTION 6240.3C

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Standards for potable water

Ref: (a) NAVMATINST 5711.9A of 17 June 1965 (NOTAL)
(b) BUMEDINST 5711.2A of 3 December 1965

1. Purpose. To establish standards for water for drinking and culinary purposes throughout the Naval Establishment and prescribe the use of the DD Form 686, Bacteriological Examination of Water, and DD Form 710, Physical and Chemical Analysis of Water.

2. Cancellation. BUMED Instructions 6240.3B and 6240.5 are canceled.

3. Background

a. Policy. The Department of Defense has established the policy of compliance by the Military Departments with United States Public Health Service Drinking Water Standards, as may be modified by the Medical Services of the Departments, or as may be modified by competent authority for purposes of international agreement.

b. International Agreement. Naval Tripartite Standardization Agreement ABC-NAVY-STD-23A was promulgated by references (a) and (b). The object of the agreement is to provide the United States Navy, the Royal Navy, and the Royal Canadian Navy assurance that drinking and culinary water delivered to each other's ships from installations under their cognizance meets certain minimum standards of quality.

4. Quality Standards. The standards for bacteriological quality, physical and chemical characteristics, and radioactivity shall be those in "Public Health Service Drinking Water Standards, 1962" Department of Health, Education, and Welfare. The Standards, as modified, may be found in NAVMED P-5010-5, Water Supply Ashore, available through the Navy Supply System.

5. Definition of Terms. The following terms are defined for clarification in interpretation of standards:

a. Adequate protection by natural means involves one or more of the following processes of nature that produce water consistently meeting the requirements of these standards: dilution, storage, sedimentation, sunlight, aeration, and the associated physical and biological processes which tend to accomplish natural purification in surface waters and, in the case of ground waters, the natural purification of water by infiltration through soil and percolation through underlying material and storage below the ground water table.

b. Adequate protection by treatment means any one or any combination of the controlled processes of coagulation, sedimentation, absorption, filtration, disinfection, or other processes which produce a water consistently meeting the requirements of these standards. This protection also includes processes which are appropriate to the source of supply; works which are of adequate capacity to meet maximum demands without creating health hazards, and which are located, designed, and constructed to eliminate or prevent pollution; and conscientious operation by well trained and competent personnel whose qualifications are commensurate with the responsibilities of the position.

c. The coliform group includes all organisms considered in the coliform group as set forth in Standard Methods for the Examination of Water and Wastewater, current edition, prepared and published jointly by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation.

d. Health hazards mean any conditions, devices, or practices in the water supply system and its operation which create, or may create, a danger to the health and well-being of the water consumer. An example of a health hazard is a structural defect in the water supply system, whether of location, design, or construction, which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources.

CLW

0000000145

(2)

e. Pollution, as used in these standards, means the presence of any foreign substance (organic, inorganic, radiological, or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water.

f. The standard sample for the bacteriological test shall consist of:

(1) For the bacteriological fermentation tube test, five standard portions of either:

(a) 10 milliliters
(b) 100 milliliters

(2) For the membrane filter technique, not less than 50 milliliters.

g. Water supply system includes the works and auxiliaries for collection, treatment, storage, and distribution of the water from the sources of supply to the freeflowing outlet of the ultimate consumer.

6. Source and Protection

a. The water supply should be obtained from the most desirable source which is feasible, and effort should be made to prevent or control pollution of the source. If the source is not adequately protected by natural means, the supply shall be adequately protected by treatment.

b. Frequent sanitary surveys shall be made of the water supply system to locate and identify health hazards which might exist in the system.

c. Approval of water supplies shall be dependent in part upon:

(1) Enforcement of rules and regulations to prevent development of health hazards;

(2) Adequate protection of the water quality throughout all parts of the system, as demonstrated by frequent surveys;

(3) Proper operation of the water supply system under the responsible charge of personnel whose qualifications are acceptable to the Navy Facilities Engineering Command or Navy Ship Systems Command.

(4) Adequate capacity to meet peak demands without development of low pressures or other health hazards; and

(5) Record of laboratory examinations showing consistent compliance with the water quality requirements of these standards.

7. Standards. The limits listed below are generally those contained in Public Health Service Drinking Water Standards, 1962. For sampling procedures and techniques, refer to NAVMED P-5010-5.

a. Bacteriological Quality (Limits). The presence of organisms of the coliform group as indicated by samples examined shall not exceed the following limits:

(1) When 10 ml. standard portions are examined, not more than 10 percent in any month shall show the presence of the coliform group. The presence of the coliform group in three or more 10 ml. portions of a standard sample shall not be allowable if this occurs:

(a) In two consecutive samples;
(b) In more than one sample per month when less than 20 are examined per month; or
(c) In more than five percent of the samples when 20 or more are examined per month.

When organisms of the coliform group occur in three or more of the 10 ml. portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(2) When 100 ml. standard portions are examined, not more than 60 percent in any month shall show the presence of the coliform group. The presence

of the coliform group in all five of the 100 ml. portions of a standard sample shall not be allowable if this occurs:

(a) In two consecutive samples;
(b) In more than one sample per month when less than five are examined per month; or
(c) In more than 20 percent of the samples when five or more are examined per month.

When organisms of the coliform group occur in all five of the 100 ml. portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(3) When the membrane filter technique is used, the arithmetic mean coliform density of all standard samples examined per month shall not exceed one per 100 ml. Coliform colonies per standard sample shall not exceed 3/50 ml., 4/100 ml., 7/200 ml., or 13/500 ml. in:

(a) Two consecutive samples;
(b) More than one standard sample when less than 20 are examined per month; or
(c) More than five percent of the standard samples when 20 or more are examined per month.

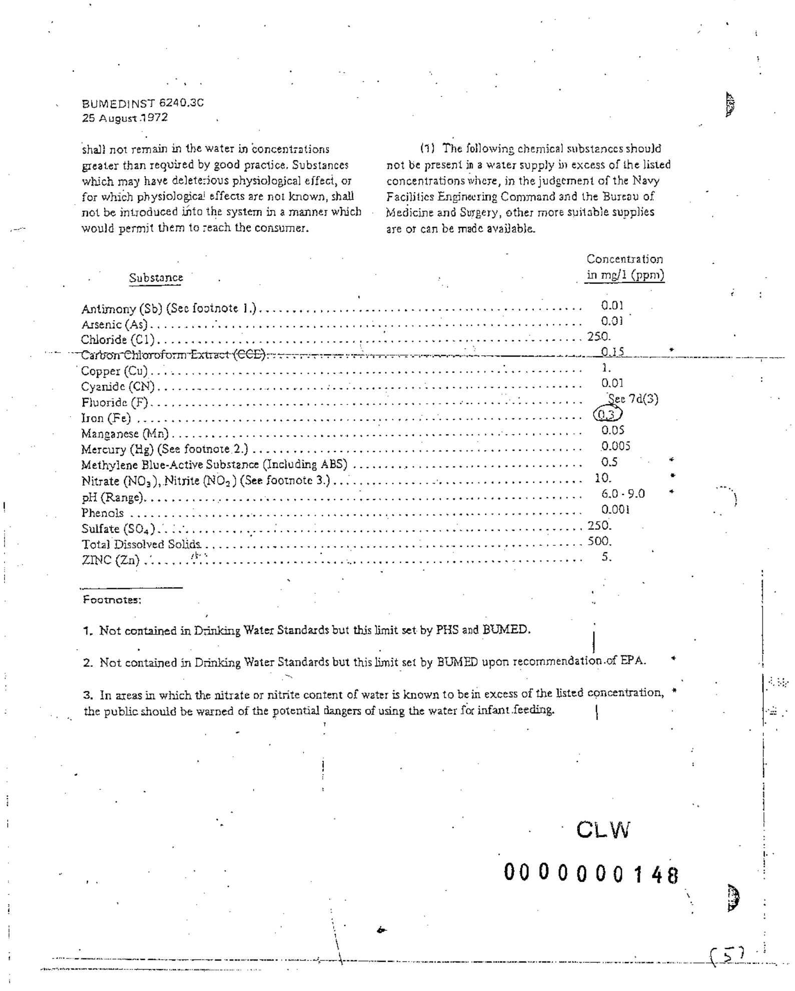
When coliform colonies in a single standard sample exceed the above values, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

b. Bacteriological Examination of Water. Bacteriological Examination of Water, DD Form 686, shall be used by all naval facilities, both ashore and afloat, to conduct bacteriological examination of water.

c. Physical Characteristics (Limits). Drinking water should contain no impurity which would cause offense to the sense of sight, taste, or smell. Under general use, the following limits should not be exceeded:

Turbidity	5 units
Color	15 units
Threshold Odor Number	3

d. Chemical Characteristics (Limits). Drinking water shall not contain impurities in concentrations which may be hazardous to the health of the consumers. It should not be excessively corrosive to the water supply system. Substances used in its treatment



shall not remain in the water in concentrations greater than required by good practice. Substances which may have deleterious physiological effect, or for which physiological effects are not known, shall not be introduced into the system in a manner which would permit them to reach the consumer.

(1) The following chemical substances should not be present in a water supply in excess of the listed concentrations where, in the judgement of the Navy Facilities Engineering Command and the Bureau of Medicine and Surgery, other more suitable supplies are or can be made available.

Substance	Concentration in mg/1 (ppm)	
Antimony (Sb) (See footnote 1.)	0.01	
Arsenic (As)	0.01	
Chloride (C1)	250.	
~~Carbon Chloroform Extract (CCE)~~	~~0.15~~	*
Copper (Cu)	1.	
Cyanide (CN)	0.01	
Fluoride (F)	See 7d(3)	
Iron (Fe)	0.3	
Manganese (Mn)	0.05	
Mercury (Hg) (See footnote 2.)	0.005	
Methylene Blue-Active Substance (Including ABS)	0.5	*
Nitrate (NO_3), Nitrite (NO_2) (See footnote 3.)	10.	*
pH (Range)	6.0 - 9.0	*
Phenols	0.001	
Sulfate (SO_4)	250.	
Total Dissolved Solids	500.	
ZINC (Zn)	5.	

Footnotes:

1. Not contained in Drinking Water Standards but this limit set by PHS and BUMED.

2. Not contained in Drinking Water Standards but this limit set by BUMED upon recommendation of EPA. *

3. In areas in which the nitrate or nitrite content of water is known to be in excess of the listed concentration, the public should be warned of the potential dangers of using the water for infant feeding. *

(2) The presence of the following substances in excess of the concentrations listed shall constitute grounds for rejection of the supply:

Substance	Concentration in mg/1 (ppm)
Antimony (Sb) (See footnote 1.)	0.05
Arsenic (As)	0.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Chromium (Hexavalent) ($Cr^{+}6$)	0.05
Cyanide (CN)	0.2
Fluoride (F)	See 7d(3)
Lead (Pb)	0.05
Pesticides, Herbacides, Fungicides (See footnote 2.)	
Chlorinated hydrocarbons	0.003 - 0.1
Organo-phosphates	0.1
Chlorophenoxy herbacides	0.005 - 1.00
Selenium (Se)	0.01
Silver (Ag)	0.05

Footnotes:

1. Not contained in Drinking Water Standards but this limit set by PHS and BUMED.

2. Concentrations represent range of levels for each group of chemicals. Individual pesticides have specific concentrations [illegible] queries should be directed to BUMED (Code 72).

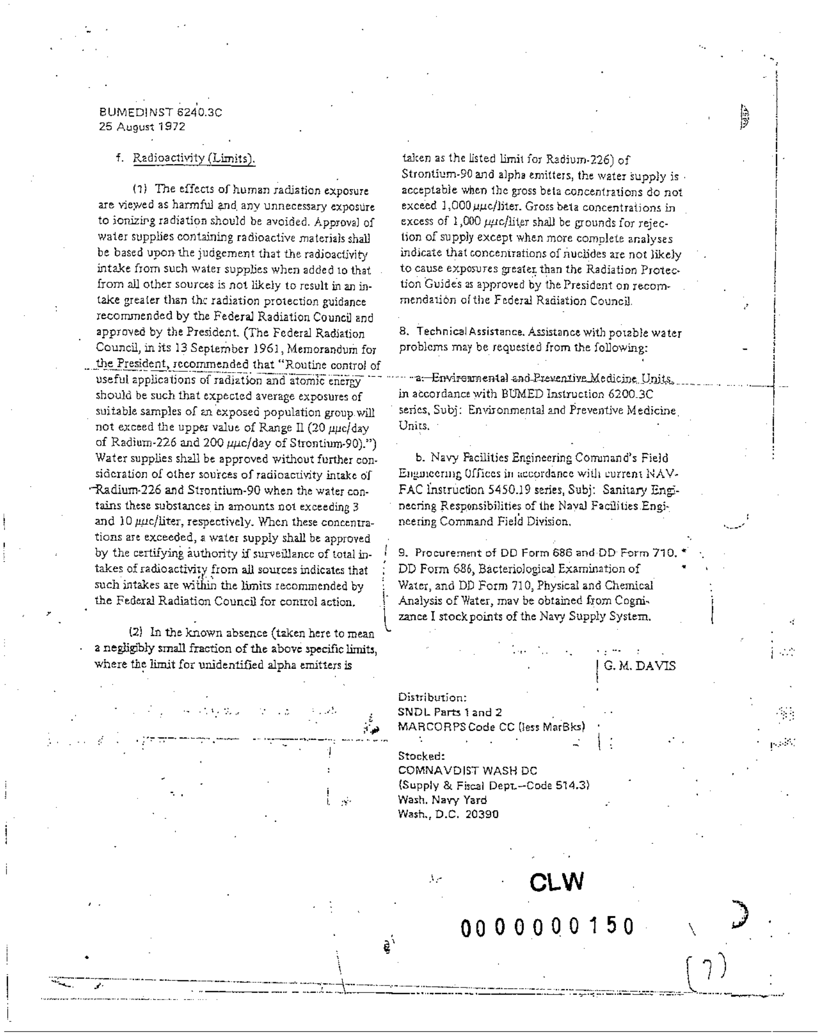
(3) **Fluoride.** When fluoride is naturally present in drinking water, the concentration should not average more than the appropriate upper limit in the following table. Presence of fluoride in average concentrations greater than two times the optimum values in the table shall constitute grounds for rejection of the supply. When fluoridation (supplementation of fluoride in drinking water) is practiced, the average fluoride concentration shall be kept within the upper and lower control limits in the table.

Annual average of maximum daily air temperatures, based on data obtained for a minimum of 5 years	Recommended control limits-Fluoride concentrations in mg/1 (ppm)...		
	Lower	Optimum	Upper
50.0 - 53.7	0.9	1.2	1.7
53.8 - 58.3	0.8	1.1	1.5
58.4 - 63.8	0.8	1.0	1.3
63.9 - 70.6	0.7	0.9	1.2
70.7 - 79.2	0.7	0.8	1.0
79.3 - 90.5	0.6	0.7	0.8

* e. Physical and Chemical Analysis of Water. Physical and Chemical Analysis of Water, DD Form 710, shall be used by all naval facil[illegible]ashore and afloat, to conduct physical and chemical analysis of water.

CLW

(6)



f. Radioactivity (Limits).

(1) The effects of human radiation exposure are viewed as harmful and any unnecessary exposure to ionizing radiation should be avoided. Approval of water supplies containing radioactive materials shall be based upon the judgement that the radioactivity intake from such water supplies when added to that from all other sources is not likely to result in an intake greater than the radiation protection guidance recommended by the Federal Radiation Council and approved by the President. (The Federal Radiation Council, in its 13 September 1961, Memorandum for the President, recommended that "Routine control of useful applications of radiation and atomic energy should be such that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II (20 $\mu\mu c$/day of Radium-226 and 200 $\mu\mu c$/day of Strontium-90).") Water supplies shall be approved without further consideration of other sources of radioactivity intake of Radium-226 and Strontium-90 when the water contains these substances in amounts not exceeding 3 and 10 $\mu\mu c$/liter, respectively. When these concentrations are exceeded, a water supply shall be approved by the certifying authority if surveillance of total intakes of radioactivity from all sources indicates that such intakes are within the limits recommended by the Federal Radiation Council for control action.

(2) In the known absence (taken here to mean a negligibly small fraction of the above specific limits, where the limit for unidentified alpha emitters is taken as the listed limit for Radium-226) of Strontium-90 and alpha emitters, the water supply is acceptable when the gross beta concentrations do not exceed 1,000 $\mu\mu c$/liter. Gross beta concentrations in excess of 1,000 $\mu\mu c$/liter shall be grounds for rejection of supply except when more complete analyses indicate that concentrations of nuclides are not likely to cause exposures greater than the Radiation Protection Guides as approved by the President on recommendation of the Federal Radiation Council.

8. Technical Assistance. Assistance with potable water problems may be requested from the following:

a. Environmental and Preventive Medicine Units, in accordance with BUMED Instruction 6200.3C series, Subj: Environmental and Preventive Medicine Units.

b. Navy Facilities Engineering Command's Field Engineering Offices in accordance with current NAVFAC Instruction 5450.19 series, Subj: Sanitary Engineering Responsibilities of the Naval Facilities Engineering Command Field Division.

9. Procurement of DD Form 686 and DD Form 710. DD Form 686, Bacteriological Examination of Water, and DD Form 710, Physical and Chemical Analysis of Water, may be obtained from Cognizance I stock points of the Navy Supply System.

G. M. DAVIS

Distribution:
SNDL Parts 1 and 2
MARCORPS Code CC (less MarBks)

Stocked:
COMNAVDIST WASH DC
(Supply & Fiscal Dept.--Code 514.3)
Wash. Navy Yard
Wash., D.C. 20390

(7)

Cercla 332

01.05-6/1/82-00332

DRAFT

INITIAL ASSESSMENT STUDY
NAVY ASSESSMENT AND CONTROL
OF INSTALLATION POLLUTANTS (NACIP) PROGRAM
MCB CAMP LEJEUNE, NORTH CAROLINA

Prepared for:

NAVAL FACILITIES ENGINEERING COMMAND
NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY

Prepared by:

WATER AND AIR RESEARCH, INC.
Gainesville, Florida

June 1982

WAR Project No. 7188-020

Cercla 332
Pg. 52
Referenced

DRAFT

[IAS-CLJ.4]4/REC.8
6/23/82

Site No. 22: Industri

Problem: Fuels amounting to 20,000 to [illegible] gallons leaked into soils around tank farm. There is potential migration to ground water.

Goal: Determine whether fuel is present in soils of the tank farm area and assess potential movement into ground water.

Approach: Sample soils around perimeter of tank farm. Sample Well No. 602, which is 1,100 feet downgradient and pumping.

Wells: Use existing Well No. 602.

Samples: Soil cores at 5 places around tank farm perimeter. Obtain cores at 1- to 2-foot intervals down to 1 foot into the water table.

Frequency: Soils--once; well water--twice separated by 2 to 3 months

Analyses: Oil and grease, lead, and volatile hydrocarbons cerda 337

01.09 - 5/1/84 - 00337

DRAFT

WORK AND SAFETY PLAN

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND

CONFIRMATION STUDY TO DETERMINE EXISTENCE AND POSSIBLE MIGRATION OF SPECIFIC CHEMICALS IN SITU

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA
CONTRACT NO. N62470-83-C-6106

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
GAINESVILLE, FLORIDA

MAY 1984

shows the number of soil cores to be augered at each of these sites, and Figures 2-3, 5, 9, and 13 show the proposed soil core locations.

7. Water Quality/Sediment/Tissue Sampling: Samples of ground water, surface water, and tissue will be collected and analyzed. Table 2-1 shows the number and type of samples to be collected from each site, as well as the analytical parameters for each sample. Figures 2-2 through 2-19 show all the proposed sampling locations, except for the pond at Site 28, where tissue samples will be collected.

not 45 at the rapid refuel area

2.1.3 EVALUATION AND REPORTS

1. Monthly Progress Reports: A brief progress report will be submitted to the EIC by the 15th day of each calendar month for the duration of the contract.
2. Evaluation of Results: All laboratory analytical results and field investigation data will be evaluated.
3. Draft Report: A draft report summarizing the results of the Verification Step will be submitted to the EIC and MCB Camp Lejeune within 45 days of completion of the onsite investigation.
4. Final Report: If the Characterization Step of the Confirmation Study is not required, the Verification Step Draft Report will be finalized.
5. Presentation: If required, a presentation of findings and conclusions will be conducted.

2.2 PROJECT SCHEDULE

Figure 2-20 presents the project schedule for each task described above. The schedule was developed to meet the milestones presented in the Contract. Throughout the course of the project, Environmental Science and Engineering, Inc. (ESE) will routinely contact the EIC to report the project status and any adjustments to the schedule.

6/15/84-03428

ESE
**ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.**

June 15, 1984
ESE No. 84 222 0200

Mr. J. G. Wallmeyer
Engineer In Charge
Department of the Navy
Atlantic Division, Code 1143
Naval Facilities, Engineering Command
Bldg. N23, Gilbert Street
Norfolk, Virginia 23511

RE: Contract No. N62470-83-C-6106, Confirmation Study,
Marine Corps Base, Camp Lejeune, North Carolina

Dear Gerry:

Attached is the monthly progress report for the period of May 16, 1984, through June 15, 1984.

Please do not hesitate to call me if you have any questions regarding this progress report.

Sincerely,

Russ Bowen

Russell V. Bowen, P.E.
Project Manager

RVB/njb

attachment

cc: B.N. McMaster

P.O. Box ESE Gainesville, Florida 32602 904/332-3318 TWX 810-825-6310

MONTHLY PROGRESS REPORT

PERIOD 5/16/84 THROUGH 6/15/84

MARINE CORPS BASE, CAMP LEJEUNE,
NORTH CAROLINA, CONFIRMATION STUDY

WORK ACCOMPLISHED

1. Finalize Work and Safety Plan and submitted plan to the Engineer In Charge (EIC) on May 30, 1984.

2. Installed 14 ground water monitoring wells (Six wells at Site 1, one well at Site 2, two wells at Site 9, one well at Site 21, two wells at Site 22, and two wells at Site 74).

PROBLEMS ENCOUNTERED

Breakdown of well drilling and decontamination equipment (drill rig and steam cleaning unit) caused delay of approximately one week. All equipment was repaired and is operating normally.

PERCENTAGE OF WORK COMPLETED

Project is approximately 12 percent complete.

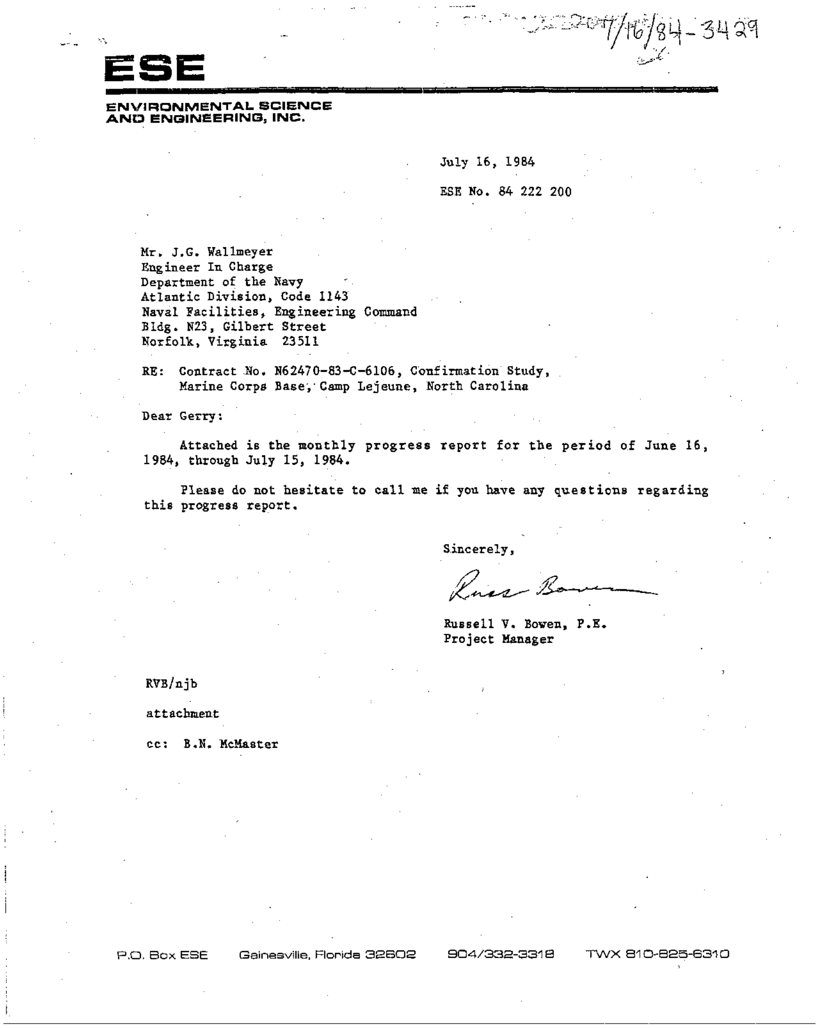
PLANS FOR FOLLOWING MONTH

1. Complete installation and development of ground water monitoring wells.

2. Collect samples of ground water, surface water, soils, sediments and fish tissue, and ship samples to ESE laboratory in Gainesville, Florida for analysis.

CONFIRMATION OF ANY CLARIFICATIONS OR TECHNICAL GUIDANCE

None.



7/16/84-3429

ESE
ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.

July 16, 1984

ESE No. 84 222 200

Mr. J.G. Wallmeyer
Engineer In Charge
Department of the Navy
Atlantic Division, Code 1143
Naval Facilities, Engineering Command
Bldg. N23, Gilbert Street
Norfolk, Virginia 23511

RE: Contract No. N62470-83-C-6106, Confirmation Study,
Marine Corps Base, Camp Lejeune, North Carolina

Dear Gerry:

Attached is the monthly progress report for the period of June 16, 1984, through July 15, 1984.

Please do not hesitate to call me if you have any questions regarding this progress report.

Sincerely,

Russ Bowen

Russell V. Bowen, P.E.
Project Manager

RVB/njb

attachment

cc: B.N. McMaster

P.O. Box ESE Gainesville, Florida 32602 904/332-3318 TWX 810-825-6310

MONTHLY PROGRESS REPORT

PERIOD 6/16/84 THROUGH 7/15/84

MARINE CORPS BASE, CAMP LEJEUNE,
NORTH CAROLINA, CONFIRMATION STUDY

WORK ACCOMPLISHED

1. Completed installation, development, and surveying of all ground water monitoring wells.
2. Collected ground water samples from 36 of 75 wells to be sampled (Sites 1,2,9,21,22,24,28,30,73, and 74), and shipped samples to ESE's laboratory in Gainesville, Florida.

PROBLEMS ENCOUNTERED

1. The ESE Field Geologist discovered that one batch of filter sand being used by the well drilling subcontractor, STS, Inc., to install ground water monitoring wells was slightly contaminated with gasoline. An investigation of the use of this filter sand indicated that 5 previously installed monitoring wells (Wells 1,2, and 3 at Site 68, Well 1 at Site 41, and Well 1 at Site 36) were potentially contaminated with this filter sand. Subsequently, each of the 5 potentially contaminated wells was pumped to flush any contamination out of the filter sand, and a new well was installed in the vicinity of each of the 5 potentially contaminated wells at no cost to NAVFACENGCOM.
2. A two week delay in the project schedule is anticipated because of problems associated with the breakdown and availability of equipment, and the installation of 5 additional wells as described above. Consequently, the field investigation is now scheduled for completion on August 4, 1984.

PERCENTAGE OF WORK COMPLETED

Project is approximately 50 percent complete.

PLANS FOR FOLLOWING MONTH

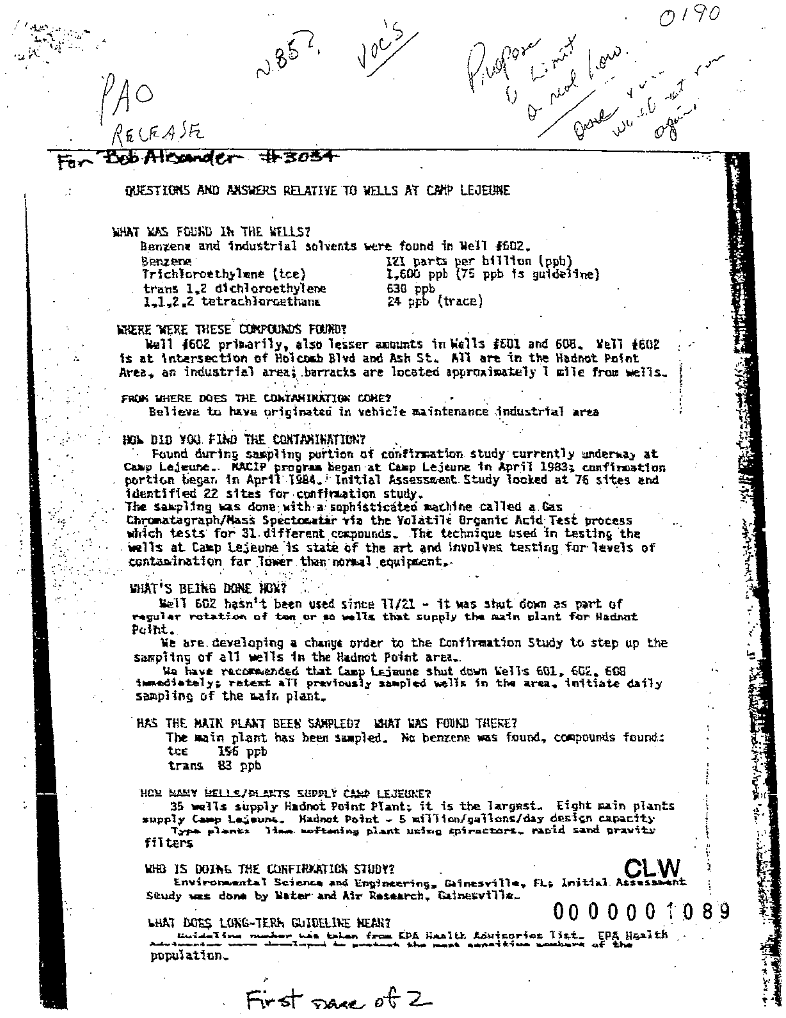
Complete collection of ground water, surface water, soil, sediment and fish tissue samples, and ship samples to ESE laboratory in Gainesville, Florida for analysis.

CONFIRMATION OF ANY CLARIFICATIONS OR TECHNICAL GUIDANCE

1. ESE will sample and analyze ground water samples collected from the 5 potentially contaminated monitoring wells identified above and from each of the 5 wells installed in the vicinity of the 5 potentially contaminated wells. Samples will be collected at the beginning and at the end of the Verification Step sampling program, and the analytical results will be used to determine if the potentially contaminated filter sand or past waste disposal operations are the cause of any detected contamination. Following initial sampling of the 5 potentially contaminated wells, each well will be pumped during subsequent Verification Step sampling events to flush any remaining contamination from the filter sand.

2. Relative to the onsite investigation of Site 45, Campbell Street Fuel Farm, ESE will focus on the two known underground fuel leak areas on the Marine Corps Air Field (Rapid Refueling Area and unpaved area southwest of Rapid Refueling Area) in conducting the soil boring investigation. The underground fuel leaks in these two areas are documented in the report entitled "Leaked Fuel Inventory, Direct Fueling Pipeline, Marine Corps Naval Air Station, Camp Lejeune, North Carolina" Soil and Material Engineers, Inc., December 7, 1983.

   The objective of the soil boring investigation is to estimate the configuration and outer limits of the leaked fuel layer floating on the surface of the shallow ground water in the two areas identified above. A total of 30 soil borings will be drilled in the unpaved areas of the air field. However, if it is determined during the course of the investigation that all 30 soil borings are not required to delineate the fuel leak in the two subject areas, ESE will drill the remaining borings along the fuel pipeline between the air field and the Campbell Street Fuel Farm to investigate those areas previously identified by Soil & Material Engineers, Inc. as having underground fuel contamination.



PAO
RELEASE

N85?

VOC'S

Propose
a Limit
a real low.
Done y[illegible]
would not run
again

0190

For Bob Alexander #3054

QUESTIONS AND ANSWERS RELATIVE TO WELLS AT CAMP LEJEUNE

WHAT WAS FOUND IN THE WELLS?

Benzene and industrial solvents were found in Well #602.

Benzene	121 parts per billion (ppb)
Trichloroethylene (tce)	1,600 ppb (75 ppb is guideline)
trans 1,2 dichloroethylene	630 ppb
1,1,2,2 tetrachloroethane	24 ppb (trace)

WHERE WERE THESE COMPOUNDS FOUND?

Well #602 primarily, also lesser amounts in Wells #601 and 608. Well #602 is at intersection of Holcomb Blvd and Ash St. All are in the Hadnot Point Area, an industrial area; barracks are located approximately 1 mile from wells.

FROM WHERE DOES THE CONTAMINATION COME?

Believe to have originated in vehicle maintenance industrial area

HOW DID YOU FIND THE CONTAMINATION?

Found during sampling portion of confirmation study currently underway at Camp Lejeune. NACIP program began at Camp Lejeune in April 1983; confirmation portion began in April 1984. Initial Assessment Study looked at 76 sites and identified 22 sites for confirmation study.

The sampling was done with a sophisticated machine called a Gas Chromatagraph/Mass Spectomater via the Volatile Organic Acid Test process which tests for 31 different compounds. The technique used in testing the wells at Camp Lejeune is state of the art and involves testing for levels of contamination far lower than normal equipment.

WHAT'S BEING DONE NOW?

Well 602 hasn't been used since 11/21 - it was shut down as part of regular rotation of ten or so wells that supply the main plant for Hadnot Point.

We are developing a change order to the Confirmation Study to step up the sampling of all wells in the Hadnot Point area.

We have recommended that Camp Lejeune shut down Wells 601, 602, 608 immediately; retest all previously sampled wells in the area, initiate daily sampling of the main plant.

HAS THE MAIN PLANT BEEN SAMPLED? WHAT WAS FOUND THERE?

The main plant has been sampled. No benzene was found, compounds found:

tce	156 ppb
trans	83 ppb

HOW MANY WELLS/PLANTS SUPPLY CAMP LEJEUNE?

35 wells supply Hadnot Point Plant; it is the largest. Eight main plants supply Camp Lejeune. Hadnot Point - 5 million/gallons/day design capacity

Type plants lime softening plant using spiractors, rapid sand gravity filters

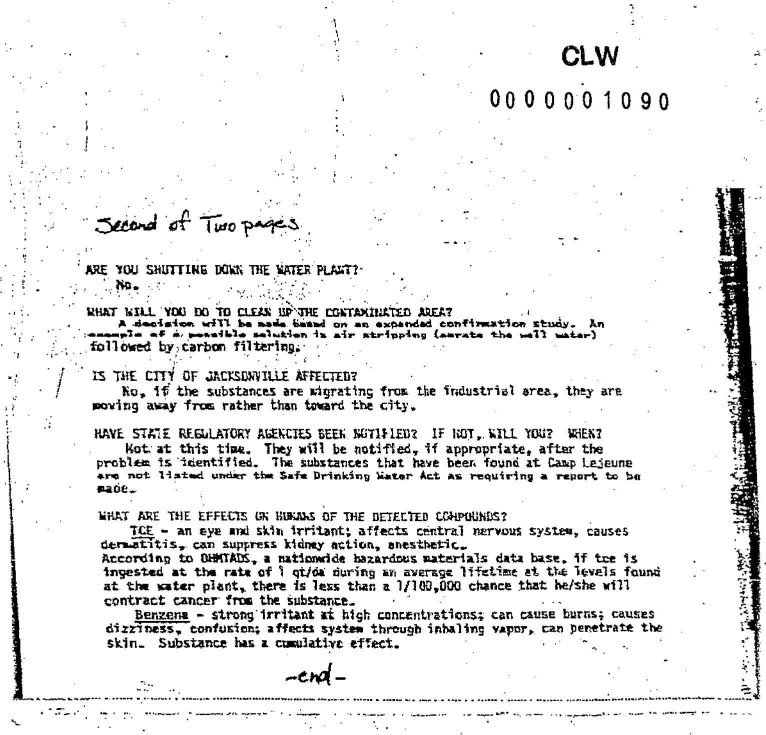
WHO IS DOING THE CONFIRMATION STUDY?

Environmental Science and Engineering, Gainesville, FL; Initial Assessment Study was done by Water and Air Research, Gainesville.

WHAT DOES LONG-TERM GUIDELINE MEAN?

Guideline number was taken from EPA Health Advisories list. EPA Health Advisories were developed to protect the most sensitive members of the population.

First page of 2



CLW

0000001090

Second of Two pages

ARE YOU SHUTTING DOWN THE WATER PLANT?

No.

WHAT WILL YOU DO TO CLEAN UP THE CONTAMINATED AREA?

A decision will be made based on an expanded confirmation study. An example of a possible solution is air stripping (aerate the well water) followed by carbon filtering.

IS THE CITY OF JACKSONVILLE AFFECTED?

No, if the substances are migrating from the industrial area, they are moving away from rather than toward the city.

HAVE STATE REGULATORY AGENCIES BEEN NOTIFIED? IF NOT, WILL YOU? WHEN?

Not at this time. They will be notified, if appropriate, after the problem is identified. The substances that have been found at Camp Lejeune are not listed under the Safe Drinking Water Act as requiring a report to be made.

WHAT ARE THE EFFECTS ON HUMANS OF THE DETECTED COMPOUNDS?

TCE - an eye and skin irritant; affects central nervous system, causes dermatitis, can suppress kidney action, anesthetic.

According to OHMTADS, a nationwide hazardous materials data base, if tce is ingested at the rate of 1 qt/da during an average lifetime at the levels found at the water plant, there is less than a 1/100,000 chance that he/she will contract cancer from the substance.

Benzene - strong irritant at high concentrations; can cause burns; causes dizziness, confusion; affects system through inhaling vapor, can penetrate the skin. Substance has a cumulative effect.

-end-

File - Lab info prepared by E. Betz 2-26-85
11330

CHRONOLOGY

Summer 84	NACIP sampled 22 wells identified as potential problems due to proximity.
30 Nov 84	Received results (ESE study). Well 602 positive for benzene. 602 was shut down and resampled.
4 Dec 84	Sampled Hadnot Point Water Plant (HP) raw and treated water, plus wells 601, 603, 608, 634, 637 and 642 because of their proximity to 602.
6 Dec	Received test results (Table [1]). Wells 601, 602, 608, raw and treated water positive for Trichloroethylene (TCE), trans-1,2-Dichloroethylene (DCE), and Tetrachloroethylene (PCE). Wells 602 and 608 also showed other Volatile Organic Chemicals (VOCs). Wells 601 and 608 were shut down.
10 Dec	Sampled HP treated water, plus Wells 601, 602, 608, 634, 637 and 642
13 Dec	Took Quality Control (QC) samples of 602, split three ways.
13-19 Dec	Took daily samples of HP raw water.
14 Dec	Received results of 10 Dec 84 sampling (Table [2]). Treated water levels dropped. Wells 634 and 637, previously showing nothing, showed significant levels of Methylene Chloride(MC). 634 and 637 were shut down.
19 Dec	Took a distribution sample from HP. Location was FC-540, far point from plant.
21 Dec	Received results of daily HP samples (Table [3]), plus JTCs QC sample and FC-540. The QC samples from JTC and Grainger (received later) confirmed the presence of TCE and DCE.
16 Jan 85	Sampled all operating wells for HP and Holcomb Blvd Water Plant (HB). 37 wells.
23 Jan	Sampled all operating wells for Onslow Beach (OB), Courthouse Bay (CHB), Camp Johnson (CJ) and Tarawa Terrace (TT) water plants. 21 wells.
27 Jan	Base Chief of Staff detected gasoline smell in water in quarters, serviced by Holcomb Blvd plant and reservoir.
27 Jan	Reservoir flushed initially. Later, drained reservoir, shut-down HB plant, scrubbed reservoir with high pressure hoses. Housing areas and mainside are now being served by HP.
29 Jan	Sampled all operating wells for Marine Corps Air Station-New River (MCAS) and Rifle Range (RR). 25 wells.
	Sampled finished water at HB (plant still shut down). Sampled

	Chief of Staff quarters (now being served with HP).
31 Jan 85	Received results of 29 Jan 85 sampling (Table [4]).
	Sampled finished water at HP distribution pump, HB reservoir, and points in Paradise Pt and Berkeley Manor housing areas (still served by HP).
1 Feb 85	Samples delivered to State Laboratory. Analysis run on most samples (finished 4 Feb 85)
4 Feb	Received results of 16 Jan 85 Well sampling (Table [5]). Wells 602, 608, and 645 were broken. Wells 634 and 651 show significant levels of TCE, DCE, PCE, and Vinyl Chloride. Wells 652 and 653 showed trace amounts of TCE. Well 651 was shut down.
	Received results of 31 Jan 85 sampling (Table [6]).
	The following wells were sampled: 602, 608, 610, 654, 645, 649 and two samples at 651.
	Reactivated HB. Began flushing entire distribution systems served by both HB and HP.
5 Feb	A treated sample from HP, HB, TT, CJ, MCAS was taken. Wells 203 and 191 at MCAS were resampled.
6 Feb	The 4 & 5 Feb 85 sampling were shipped to JTC.
7 Feb	Sampled raw and finished water at both plants and two samples from HB distribution system.
	Received results of 23 Jan 85 Well sampling (Table [7]).
8 Feb	Received results of 15 wells of the 29 Jan 85 sampling (Table [8]). Received results of 7 Feb 85 sampling (Table [9]).
	Received results of the duplicate sampling of 651 on 4 Feb 85, (Table [10]).
12 Feb	Resampled TT plant, TT-26, and TT New Well
	Received results of HP and TT plant sampling on 5 Feb 85, (Table [11]).
14 Feb	Received results of TT resampling on 12 Feb 1985, (Table [12]).
19 Feb	Resampled TT plant, TT-26 and TT New Well, split two ways.
20 Feb	Sampled treated water at OB, CHB, RR. Sampled Well M-168 at CJ. Resampled CHB new well. Shipped one TT set from 19 Feb 85 to State Lab. Shipped 20 Feb 85 samples to JTC.

21 Feb 85	Shipped other TT set from 19 Feb 85 to JTC.
	Resampled HP and HB treated, BM-5400 and hydrant at MOQ 2204; and sampled Bldg 65 lab with Mike Bell from State.
22 Feb	Received results of 19 Feb 1985 sampling run by State Laboratory (Table [13]).
25 Feb	Received results of 19 Feb 85 sampling run by JTC (Table [13]).

Abbreviations for Following Tables

Trans-1,2-Dichloroethylene	DCE
Tetrachloroethylene (Perchloroethylene)	PCE
Trichloroethylene	TCE
Benzene	B
1,1-Dichloroethylene	11D
Toluene	T
Vinyl Chloride	VC
Methylene Chloride	MC
None Detected	ND

Notes for Following Tables

1. Results from hard copy in LANTNAVFACENGCOM LTR of 8 Jan 1985 (Not from PHONCON) received NREAD 11 Feb 85.
2. Results from hard copy received 11 Feb 85 from State Laboratory.
3. Results from hard copy in LANTNAVFACENGCOM LTR of 12 Feb 85 (Not from PHONCON) received NREAD 15 Feb 85.
4. Results from hard copy in LANTNAVFACENGCOM LTR of 14 Feb 85 (Not from PHONCON) received NREAD 19 Feb 85.
5. Results from hard copy in LANTNAVFACENGCOM LTR of 19 Feb 85 (Not from PHONCON) received NREAD 21 Feb 85.

All results are reported in parts per billion (ppb)

TABLE [1]

LAB: JTC Sampled: 4 Dec 84 Detection Limit: 10ppb

Sample Point	DCE	PCE	TCE	B	11D	T	VC	THM
HP Treated	83	3.9	200	ND	ND	ND	ND	P
HP Raw	15	ND	46	↕	↕	↕	↕	P
601	88	5.0	210	ND	ND	ND	ND	
602 (11/30/84)	630	24	1600	120	2.4	5.4	18	
603	ND	ND	ND	ND	ND	ND	ND	
608	5.4	↑	11.0	3.7	↑	↑	↑	
634	ND	|	ND	ND	|	|	|	
637	↕	↓	↕	↕	↓	↓	↓	
642	ND	ND	ND	ND	ND	ND	ND	

See Note 1.

TABLE [2]

LAB: JTC Sampled: 10 Dec 84 Detection Limit: 10ppb

Sample Point	DCE	PCE	TCE	B	MC	THM
601	99	ND	230	ND	10	
602	380	↑	540	720	ND	
603	ND	|	ND	ND	7.0	
608	2.4	|	13	4.0	14	
634	2.3	|	ND	ND	130	
637	ND	|	↕	↑	270	
642	ND	↓	ND	↓	38	
HP Treated	2.3	ND	2.3	ND	ND	P

See Note 1.

TABLE [3]
Hadnot Point Raw Water

LAB: JTC Detection Limit: 10ppb

Sample Point	DCE	PCE	TCE	MC	THM
12/4/84	15	ND	46	ND	P
12/13/84	ND	↑	ND	54	P
12/14/84	↑	|	↑	ND	P
12/15/84	|	|	|	↑	P
12/16/84	|	|	|	|	P
12/17/84	|	|	|	|	P
12/18/84	↓	↓	↓	↓	P
12/19/84	ND	ND	ND	ND	P
12/19/84(FC540)	ND	ND	1.2	ND	P

See Note 1.

TABLE [4]

LAB: NC State Sampled: 29 Jan 85 Detection Limit: 50ppt

Sample Point	TCE	EDB(Ethylene dibromide)
HB Before Reservoir	339.8	ND
HB After Reservoir	8.2	↕
MOQ 2212	1040.9	ND
Gas Sample	ND	

See Note 2.

Table [5]

LAB: JTC Sampled: 16 January 1985 Detection Limit: 10ppb

Well	DCE	TCE	PCE	VC	11D
601	8.8	26	ND	ND	ND
634	700	1300	10	6.8	ND
651	3400	3200	386	655	187
652	ND	9.0	ND	ND	ND
653	ND	5.5	ND	ND	ND

None Dectected:
603
606
609
611
613
614
616
620
621
627
632
633
635
636
637
638
639(OLD)
639(NEW)
640
641
642
643
644
646
647
648
650
655
LCH 4007

Broken Samples:
602
608
645
651

See Note 3.

TABLE [6]

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES
DIVISION OF HEALTH SERVICES
OCCUPATIONAL HEALTH LABORATORY

COMPANY:Camp Lejeune Water System
ADDRESS:Camp Lejeune, Jacksonville, N.C.
SERVICE REQUESTED:VOLATILE ORGANIC ANALYSIS
SAMPLE TAKEN ON:1/31/85
SAMPLE TAKEN BY:Betsy Betz
SUBMITTED TO LABORATORY:2/1/85
SUBMITTED BY:Betsy Betz

DATE OF ANALYSIS:2/1-4/85
ANALYSED BY:John L. NeaL

DATE REPORTED:2/4/85

RESULTS IN PPB (ug/liter)

LOCATION	DICHLOROETHYLENE	TRICHLOROETHYLENE
Bldg 20	321.3	900.0
Bldg 670 Bottom	7.4	24.1
MOQ 2212 Cold Water	249.4	724.6
Bldg 670 Top	7.6	26.8
MOQ 2212 Hot Water	201.2	612.9
Bldg 670 Middle	7.8	25.8
Tank SLCH 4004	107.5	318.3
Hydrant MOQ 2204	307.6	839.7
Hydrant Elev. Tank S-830	340.0	849.0
Tank S-2323	159.0	407.1
BM 5677	368.7	981.3
BM 5531	335.0	905.5
Bldg PP 2600	332.4	890.9
Bldg 5400	406.6	1,148.4

COMMENTS:

Also identified in all samples were chloroform, dichloromethane, and two (2) unidentified peaks possibly dibromomethane and bromoform. Total Trihalomethanes <<100.0 PPB.

REPORTED BY: John L. Neal

cc. Charles Rundgren, Water Supply Branch
Mike Bell, ERO
✓Fred Hill, ERO
Environmental Epidemiology

TABLE [7]

Well Analysis by JTC

Sampled: 23 Jan 85

System	Well	DCE	TCE	PCE	VC	THM
CHB	A-5	ND	ND	ND	ND	P
TT	TT-26	92	57	158	27	
TT	New	11	5.8	132	ND	

None Detected:
BB-44
BB-220
BB-221
CHB New Well
BA-164
BA-190
M-142
M-192
M-267
M-628
M-629
M-630
TT-25
TT-30
TT-31
TT-52
TT-54
TT-67

See Note 4

TABLE [8]

Well Analysis by JTC

Sampled: 29 Jan 85

Well	TCE
4150	2.5

None Detected:
100
190
201
325
502
504
604
700
TC-1000
1001
1251
1253
1254
1255
1256
5001
5009
131
4140
RR-45
RR-47
RR-97

See Note 5

TABLE [9]

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES
DIVISION OF HEALTH SERVICES
OCCUPATIONAL HEALTH LABORATORY

COMPANY: Camp Lejeune Water System
ADDRESS: Camp Lejeune, Onslow County
SAMPLE TAKEN ON: 02/07/85
SAMPE TAKEN BY: J. Fred Hill
SUBMITTED TO LABORATORY: 02/08/85
SUBMITTED BY: J. Fred Hill, E. Betz

DATE OF ANALYSIS: 02/08/85
ANALYSED BY: John L. Neal, Vicki Painter

DATE REPORTED: 02/08/85

RESULTS IN PPB (ug/L)

LOCATION	trans 1,2-DCE	CHC13	DCBM	TCE	DBCM
Bldg. 20 Res. Fin. Water	5.3	10.3	6.3	16.8	3.4
Bldg. 20 Filter Eff.#1	<2.0	6.8	4.3	<2.0	2.0
Bldg. 20 Filter Eff.#2	<2.0	9.1	5.7	3.4	3.4
Bldg. 20 Influent	<2.0	5.0	4.0	<2.0	1.5
Bldg. 670 Res. Fin. Water	<2.0	14.84	8.3	<2.0	3.6
Bldg. 670 Filter Eff.#1	<2.0	11.45	6.1	<2.0	1.2
Bldg. 670 Filter Eff.#2	<2.0	10.03	5.8	<2.0	1.2
Bldg. 670 Influent	<2.0	8.1	4.9	<2.0	1.7
MOQ 2204 Hydr. Dis. Sys.	9.0	23.92	10.74	32.4	4.5
Bldg. 5400 Ber. Man. Sch.	44.8	24.49	10.83	135.1	5.0

COMMENTS: trans 1,2-DCE is trans 1,2-dichloroethylene, CHC13 is Chloroform, DCBM is dichlorobromomethane, TCE is trichloroethylene, and DBCM is dibromochloromethane. Samples analysed by purge and trap method utilizing Hall detector in the halogen mode.

REPORTED BY: John L. Neal

cc. Charles Rundgren, Water Supply Branch
Mike Bell, ERO
✓J. Fred Hill, ERO
Environmental Epidemiology

TABLE [10]

Duplicates of 651

Sampled: 4 Feb 1985 LAB: JTC

	#1	#2
DCE	7580	8070
PCE	400	397
TCE	18900	17600
VC	168	179

TABLE [11]

Sampled: 5 Feb 85 LAB: JTC

	TCE	DCE	PCE
HP	429	150	ND
TT	12	ND	215

TABLE [12]

Sampled: 12 Feb 85 LAB: JTC

	PCE	TCE	DCE	B
TT-26	3.8	ND	ND	ND
TT New Well	37	1.8	1.9	6.5
TT Plant	ND	ND	ND	ND

See Note 5

Table [13]

Sampled: 19 Feb 85

	TT-Treated		TT-New Well		TT-26	
	State	JTC	State	JTC	State	JTC
DCE	ND	ND	Trace	13	Trace	9.5
PCE	ND	↑	26.17	ND	55.17	64
Benzene	NA	↓	ND	6.3	ND	ND
TCE	ND	ND	53.53	ND	3.91	4.1

NA=Not Analyzed

Gas Chromatograph Summary

The pending orders with Perkin-Elmer were placed by P & C on 20 Feb 85. Perkin-Elmer promised delivery in three weeks (14 Mar 85). On 21 Feb 85 the Service Rep, who will install our GC, called. He stated that he would try to speed up the requisitions. He said as soon as the gas filters and driers came in to call him and make an appointment for installing GC (should not have to wait more than a week). As soon as we have an appointment for installation, then Perkin-Elmer will schedule the on-base training class.

Running Samples

Standards are on order from EPA.

Quality Control Check samples for certification are on order from the State of North Carolina.

When all is set up, using one technician, Seven samples a day could be analyzed. That would be the maximum the lab could run. That is not including collection. Seven samples a day would be starting with analysis at 0800. A hour a sample is the analysis rate. Only one sample can be run at a time. At least one standard a day should be run, taking an hour for it.

Gas Chromatograph Status

Requirements for Installation

1. Ventilation - Completed by Base Maintenance on 7 Feb 85.
2. Gas Supplies
   - Safety Rack for Gas Cylinders - Built by Base Maintenance on 14 Feb 85.
   - Hole for Gas Lines - Finished by Base Maintenance on 19 Feb 85.
   - Gas Cylinders - Received from National Welders by 20 Feb 85
   - Gas Regulators - Received from National Welders by 20 Feb 85.
   - Gas Filters 7 Drier - Ordered from Perkin-Elmer on 20 Feb 85 (Pending).
3. Electrical Supply - Installed by Base Maintenance on 13 Feb 85

Requirements for Operation

1. Flow Meter for regulating gas - Ordered from Perkin-Elmer on 20 Feb 85 (Pending).
2. Packed Columns, which are the sample reaction tubes that are specific for parameters - Ordered from Perkin-Elmer on 20 Feb 85 (Pending).

21 Feb 85	Shipped other TT set from 19 Feb 85 to JTC.
	Resampled HP and HB treated, BM-5400 and hydrant at MOQ 2204; and sampled Bldg 65 lab with Mike Bell from State.
22 Feb	Received results of 19 Feb 1985 sampling run by State Laboratory (Table [13]).
25 Feb	Received results of 19 Feb 85 sampling run by JTC (Table [13]).

Abbreviations for Following Tables

Trans-1,2-Dichloroethylene	DCE
Tetrachloroethylene (Perchloroethylene)	PCE
Trichloroethylene	TCE
Benzene	B
1,1-Dichloroethylene	11D
Toluene	T
Vinyl Chloride	VC
Methylene Chloride	MC
None Detected	ND

Notes for Following Tables

1. Results from hard copy in LANTNAVFACENGCOM LTR of 8 Jan 1985 (Not from PHONCON) received NREAD 11 Feb 85.
2. Results from hard copy received 11 Feb 85 from State Laboratory.
3. Results from hard copy in LANTNAVFACENGCOM LTR of 12 Feb 85 (Not from PHONCON) received NREAD 15 Feb 85.
4. Results from hard copy in LANTNAVFACENGCOM LTR of 14 Feb 85 (Not from PHONCON) received NREAD 19 Feb 85.
5. Results from hard copy in LANTNAVFACENGCOM LTR of 19 Feb 85 (Not from PHONCON) received NREAD 21 Feb 85.

All results are reported in parts per billion (ppb)

Cercla 523

09.11-12/01/84-00523

Camp Lejeune water testing underway

? Dec '84

Globe Staff Report

Environmental officials here are taking precautionary measures to ensure drinking water is free from possible contamination.

AS A RESULT of water samples taken Dec. 3, four wells in the Hadnot Point industrial area were found to contain some traces of organic compounds. According to Base Environmental Engineer, Bob Alexander, four of 35 wells serving the Hadnot Point water treatment plant were shut down and additional test samples ordered.

None of the organic compounds noted in the test samples are listed in the regulations under the Safe Drinking Water Act. Testing is being conducted as part of a basewide confirmation study which is currently underway to verify whether any groundwater contamination exists and to identify abatement measures.

The closing of the four wells has not affected the ability of the Hadnot Point water treatment plant to produce potable water. Alexander added that daily water samples are being taken from the water treatment plant to ensure drinking water remains within prescribed federal and state guidelines established by the Safe Drinking Water Act.

A DETAILED SAMPLING effort of the entire Hadnot Point water system will be completed in the coming months to pinpoint any wells which might contain organic compounds. If necessary, an abatement plan will be prepared for approval by the North Carolina Division of Health Services.

The Hadnot Point water treatment plant has the capacity to produce five million gallons of potable water per day. It serves the H
dustrial area, Fren
Hospital Point. Alexa
that every effort will
tain the excellent qua
traditionally provide
Camp Lejeune.

Gerald Dixon, a Nor
Law Enforcement Divis
returned the wallet Priva
Daniely, 8th Communica
vice Support Group los
Wilmington. The wallet was returned with
$140 still in it.

Anniversary celebrated

As one of two major operational commands in the Marine Corps, Fleet Marine Force, Atlantic, commanded by Lieutenant General Al Gray, has been responsible for the amphibious combat element of the U. S. Navy's Atlantic Fleet since 1946.

THE HEADQUARTERS STAFF, composed of approximately 500 officers and enlisted men, controls the deployable Marine units located at Camp Lejeune, New River, Cherry Point, N.C. and Beaufort, S.C.

As a "Force in Readiness," FMFLant has continually deployed units under its control since 1948, reaching such faraway lands as Norway, Germany and nations of the Mideast with a regularity that guarantees worldwide recognition of the uniforms of U.S. Marines.

Lieutenant General Gray and his staff at Norfolk, Va., celebrate the 38th anniversary of the command on Dec. 16 with best wishes to all "'Lant Marines and sailors" and confident hopes for a coming 39th year as an amphibious "Force in Readiness."

Construction creates need for alternate route

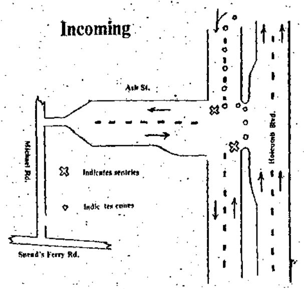
Story by Sgt. Dennis V. Carter

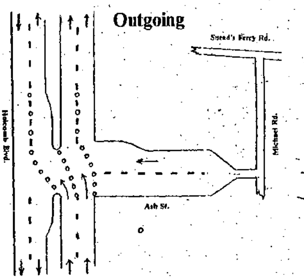
Traffic on Snead's Ferry Road is scheduled to be rerouted Dec. 15-19. The rerouting will effect both incoming and outgoing traffic.

THE REROUTING IS necessary due to railroad construction of rails that cross Snead's Ferry Road. Because of the construction, part of Snead's Ferry Road will be closed.

Traffic that normally was routed down Snead's Ferry Road will be rerouted down Ash Street for incoming traffic.

Outgoing traffic will be basically the same, except that traffic heading toward Swansboro will need to stay in the right lane.





GLOBE
Shopco Publishing Company

The Globe is published every Thursday in cooperation with the Joint Public Affairs Office, Camp Lejeune, N.C.

Everything advertised in this publication must be

Doc. No.: CLEJ-00523-9/11-10/16/86

The Office... bus leaves from the O'Club at [illegible] a.m., leaves Myrtle Beach at 4:30 p.m. and arrives home at 7 p.m. All members are invited. Send $8,50 reservation check to OWC, P.O. Box 8531, Camp Lejeune, NC 28540. Reservation deadline is Oct. 24.

10/16/86

NEWSBRIEFS

Memorial of-limits

The Beirut Memorial site at the entrance of Camp Johnson is off limits until the Oct. 23 dedication ceremony. Although construction is nearly completed, visits to the sight or casual walk-throughs prior to Oct. 23 are a hindrance to workers and are strictly prohibited.

Retired Military Day

Marine Corps Base will host the annual Retired Military Day at Marston Pavilion on Oct. 25. The event is open to retired persons and their families from all branches of the Armed Services and is intended to provide information on a wide variety of subjects.

A fried chicken lunch will be served at a cost of $5 per person. Call 451-2524/2525 for reservations.

In conjunction with Retired Military Day, a golf tournament is also planned for Oct. 25 for all interested retired golfers. Cost is $10 per person and covers green fees, cart fees and prizes. Tee-off times are 7:30 a.m. and 1:30 p.m. Call John Fletcher at 451-5445 to sign up for the tournament or more information.

Field House closed

The gymnasium floor of Goettge Memorial Field House will be closed Oct. 31 to Nov. 23. However, the mini-exercise room, locker rooms, showers and sauna facilities will remain available for use except from 3 p.m. on Nov. 7 to 10 a.m., Nov. 12.

The gym floor will open for use on Nov. 24.

Bacteria detected

Marine Corps Base, Camp Lejeune, operates eight separate water systems to supply the water needs of the entire Camp Lejeune/New River complex.

During routine testing of the systems serving Courthouse Bay and the Rifle Range, two water samples in each system showed a coliform bacteria concentration above the allowable limits for the systems. Subsequent water samples within these systems indicated that no coliform bacterial were present. Since subsequent testing indicated that no coliform bacteria was present, there is no cause for concern.

Coliform bacteria is not generally considered to be a disease producing organism. Its presence merely suggests that conditions may be appropriate for the growth of other disease carrying organisms.

The base monitors all water systems aboard the base to ensure compliance with water quality standards and reporting requirements of the Safe Drinking Water Act. The search continues to find the cause of the abnormal readings.

If you have any questions, call the Head, Occupational Preventive Medicine Department, 451-5707.

Birthday ceremony

Camp Lejeune's Joint Daytime Ceremony, celebrating the Marine Corps' 211th Birthday, will be held Nov. 10 at 9:30 a.m. at Liversedge Field.

The ceremony will include a historical uniform pageant, rededication of the National and Marine Corps colors and the traditional cutting of the Marine Corps birthday cake. According to tradition, the first pieces of cake will be presented to the oldest and youngest Marines at Camp Lejeune.

The ceremony is open to military personnel and civilians. The uniform for military spectators is as follows:

Marines in formation—winter service "A".

Other Marines—dress blue "B" or winter service "A".

Navy personnel—service dress blue.

Further information on the seating arrangement for the ceremony will appear in the Oct. 30 issue of the *Globe*.

3d MarDiv opens chapter

The 3d Marine Division Association plans to open a Chapter in the state of North Carolina. All former members of the Division including retired and U.S. Navy, should contact Jimmie A. Bryant, P.O. Box 1224, Lenoir, NC 28645, or call (704) 758-2023 for more information.

DOC NO: CCEJ-00523-9,11-1

Commission reviews state's water classificatio

By MONTE BASGALL
Staff Writer

Nagging questions about chemical pollution have prompted state officials to take a hard look at North Carolina's 30-year-old system for qualifying water bodies as sources of raw drinking water.

"We have a communications problem," Robert F. Helms said last week at a work session of the N.C. Environmental Management Commission, which is charged with establishing such standards. "If the commission doesn't clear this up, we're going to have problems dealing with the public."

Helms directs the N.C. Division of Environmental Management, which is charged with advising the commission and enforcing its rules.

He was referring to the alphabetized water quality classification system for lakes, rivers and major streams.

Most freshwater bodies are classified A-II, B or C, depending upon whether they are to be maintained for drinking water supplies, swimming activities, or fishing and boating.

An additional classification, A-I, covers a few additional waterways that the state considers "pristine."

Except for A-I, the requirements of the alphabetical standards aren't that different, although the B (swimming) classification calls for lower summer bacteria counts than the other two, while the A-II (drinking water) classification has the most restrictions on toxic chemicals and other problem substances.

Before a segment is recommended for the drinking water classification, the state repeatedly tests water in the affected area to make sure that bacterial and existing chemical standards are being met.

It also evaluates what is being released into the water by dischargers immediately upstream.

Not considered are the hundreds of chemicals for which the state has developed no standards. In addition, the state's evaluation does not extend to far-upstream pollution sources — including the risk that land uses could result in chemical spills or agriculture pesticide runoff.

According to a division briefing paper that Helms' staff distributed to the commission, critics feel upstream pollution is not adequately accounted for when the state reclassifies water to the A-II (drinking water) standard.

Critics also say that classifying all but the most pristine raw drinking water as A-II "implies to the public that these supplies are of similar quality despite varying types and amounts of point (sewage discharges) and non-point sources of pollution," the paper added.

The issue first came to a head in October, when the commission voted to reclassify most of Lake Jordan to the A-II drinking water standard, but only on a "qualified" basis.

The qualified classification — which requires additional studies before any of Jordan's water could be allocated for drinking — was imposed because of questions about industrial chemical pollutants that are released into upstream sections of the Haw River, which feeds the lake.

The public also is confused about the present alphabet ratings, officials said. They noted that while the A category logically would be considered better than B, the bacteria standard for the state's B (swimming) water quality classification is more stringent than A-II.

Helms' staff suggested a "narrative," "descriptive," non-alphabetized alternative. One idea would create several "water supply" classifications covering an entire watershed.

"Natural watersheds" would be preserved in a pristine state, while "rural watersheds" would allow septic tanks and agricultural activities but no sewage treatment plant discharges.

"Developing watersheds" would permit domestic sewage treatment plant discharges, but no industrial development. "Industrial watersheds" would require special attention to the threat of toxic pollutants, with more stringent classifications in some sections than others.

The commission decided last week to study the question.

h, N.C., Tues., April 17, 1984

ion reviews state's water classification system

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0196
Doc No.: CLEJ-00149-3.04-1/08/85

ATTN: BOB ALEXANDAR, 3043

MCB CAMP LEJEUNE MONITORING

I. BACKGROUND: In response to ESE test results on Well 602:

A. Week of 3 Dec 1984: Tested the seven wells (in the area) and the Water Plant (untreated/treated)

B. Week of 10 Dec 1984: Resampled the seven wells and the Water Plant (treated), and started daily sampling of the Water Plant (untreated) for one week with the far end of the distribution (i.e., French Creek) also to be sampled (only) on the seventh day (to determine if distribution system clear). In addition, for Quality Control, a 3-way sample split will be performed on Well 602 between three laboratories; ESE, JTC and also Grangier (via the Reed Contract).

II. PROPOSED INTERIM MONITORING:

A. Sample the other seven Water Plants (treated, preferably after reservoirs) for VOA only (to determine if the problem is limited to Hadnot Point). Estimate: 1 day to collect.

B. Sample all of the about 100 wells (~~Exc~~including the seven wells above) for VOA to determine if problem is limited to the three wells. Estimate: 10 wells per day, i.e., 10 normal workdays (2 weeks) to collect, starting with the remaining wells in Hadnot Point, then Holcomb Boulevard.

III. COSTS (LANTNAVFACENGCOM FUNDING):

A. Initial 9 samples: 8 X $200 (routine) + $600 (2 day) = $2.2K

B. Next 18 samples: 16 X $600 (2 day) + 3 X Say $300 (15 day) =
Say $10.5K
Subtotal: Say $12.7K

C. First 7 proposed samples: 7 X $600 (2 day) = $4.2K

D. Remaining 100 proposed samples: 100 X $300 (15 day) = $30K
Total: $46.9K Say $47K

IV. CONTINGENCY PLANS:

LANTNAVFACENGCOM is evaluating alternatives to respond to the test results to insure a safe drinking water supply.

V. ADDITIONAL ESE WORK:

ESE to be tasked to define scope of problem/solution, in addition to sampling all the wells for all SDWA/priority pollutant parameters (to determine if there are addition problems. Costs (LANTNAVFACENGCOM fu[illegible] $20-30K.

MFR PAR II. 114. 1141, 1142, 1143. CAD

Cercla 338

01.08-1/1/85-00388

EVALUATION OF DATA FROM FIRST ROUND OF VERIFICATION SAMPLE COLLECTION AND ANALYSIS

CONFIRMATION STUDY TO DETERMINE EXISTENCE AND POSSIBLE MIGRATION OF SPECIFIC CHEMICALS IN SITU

MARINE CORPS BASE
Camp Lejeune, North Carolina

Contract No. N62470-83-C-6106

Prepared for:

Naval Facilities Engineering Command
Atlantic Division
Norfolk, Va 23511-6287

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida

January 1985

General
- Use both sides of the page pls
- Extend contract date for all contracts including this one!

check [illegible]

- Should have included
  - site maps w/ well & sample locations
- Improve readibility of computer tables
- Check w/ Jerry & Steve on results from well VOA sampling by MCB. If any potable wells near our sites & we haven't done VOA's pls include in this round.

[illegible]

- Add VOA's @ all pesticide sites

soil gas investigation:
$8-9K
mobilization costs

We must send them our (114's) report on well data; what it means & what wells to keep shut down.

SITE 22--INDUSTRIAL AREA TANK FARM

Site Investigation

o Two shallow ground water monitoring wells:
    Well 22GW1 - In tank farm area.
    Well 22GW2 - Between tank farm and deep water supply well No. 602 (Well 22GW3).

o Deep water supply well No. 602 (Well 22GW3)

Data Evaluation

The analytical data for Site 22 is presented in Table 2-9, and information relative to the detected analytical parameters is presented in Table 2-10. As shown in Table 2-9, extremely high levels of benzene, ethylbenzene, toluene, and lead were detected in Well 22GW1 located at the tank farm. These compounds are fuel components and further document the leakage of large quantities of fuel at this site. Additionally, low levels of 1,2DCLEE and 12DCLP were detected in Well 22GW1. These levels may be attributed to possible spillage of degreasing solvents in the tank farm area. Well 22GW2 appears to be free from contamination, with the exception of a low concentration of O&G (1 mg/L). Of extreme importance is the high level of benzene (380 ug/L) detected in the sample collected from deep water supply well No. 602 (Well 22GW3). This benzene concentration far exceeds the 10^{-5} human health risk limit of 6.6 ug/L; therefore, the use of this well should be discontinued immediately. In addition, the CCL3F concentration of 3 ug/L detected in well No. 6 (Well 22GW3) exceeds the 10^{-5} human health risk limit of 1.9 ug/L.

Migration Potential

All analytical parameters for Well 22GW~~3~~2 were below detection limit, except O&G, and the O&G concentration was only 1 mg/L. Significant migration of contaminants in the shallow ground water westward from the tank farm has not occurred. Water supply well No. 602 (Well 22GW3), however, contains detectable levels of six organic compounds which may

Table 2-9. Site 22--Industrial Area Tank Farm Sampling Data

ENVIRONMENTAL SCIENCE & ENGINEERING 12/05/84

STATUS: PRELIMINARY

PAGE 15

PROJECT NUMBER 8422.400
FIELD GROUP: CLGW1
PARAMETERS: LJS SAMPLES: PART

PROJECT NAME CAMP LEJEUNE
PROJECT MANAGER: BOWEN/GEISZLER
FIELD GROUP LEADER: BOB GREGORY

SAMPLE NUMBERS

602

PARAMETERS	STORET # METHOD #	22GW1 374716	22GW2 374717	22GW3 374718
DATE		7/6/84	7/5/84	7/6/84
TIME		830	740	850
ACROLEIN (UG/L)	34210 0	<8	<10	<10
ACRYLONITRILE (UG/L)	34215 0	<5	<10	<10
BENZENE (UG/L)	34030 0	17000	<0.3	380
BROMODICHLOROMETHANE (UG/L)	32101 0	<0.50	<0.70	<0.70
BROMOFORM (UG/L)	32104 0	<1.10	<1.60	<1.50
BROMOMETHANE (UG/L)	34413 0	<0.8	<1	<1
CARBON TETRACHLORIDE (UG/L)	32102 0	<1.5	<1.6	<1.5
CHLOROBENZENE (UG/L)	34301 0	<0.40	<0.50	<0.50
CHLOROETHANE (UG/L)	34311 0	<1	<2	<2
2-CHL*ETH*VINYLETHER (UG/L)	34576 0	<1	<2	<2
CHLOROFORM (UG/L)	32106 0	6.70	<0.70	<0.70
CHLOROMETHANE (UG/L)	34418 0	<0.9	<1	<1
DIBROMOCHLOROMETHANE (UG/L)	34306 0	<0.90	<1.20	<1.20
DICHL*DIFLUO*METHANE (UG/L)	34668 0	<0.9	<1	<1
1,1-DICHLOROETHANE (UG/L)	34496 0	<0.40	<0.60	<0.60
1,2-DICHLOROETHANE (UG/L)	34531 0	52	<1.0	46
1,1-DICHLOROETHYLENE (UG/L)	34501 0	<0.90	<1.3	<1.3
T-1,2-DICHLOROETHENE (UG/L)	34546 0	<0.85	<1.3	7.8
1,2-DICHLOROPROPANE (UG/L)	34541 0	18	<0.7	<0.7
CIS-1,3-DICH*PROPENE (UG/L)	34704 0	<0.6	<0.8	<0.8

Table 2-9. Site 22--Industrial Area Tank Farm Sampling Data (Continued, Page 2 of 2)

PAGE 17

ENVIRONMENTAL SCIENCE & ENGINEERING 12/05/84

STATUS: PRELIMINARY

PROJECT NUMBER 84222400
FIELD GROUP: CLJW1
PARAMETERS: LJ5 SAMPLES: PART

PROJECT NAME CAMP LEJEUNE
PROJECT MANAGER: BOWEN/GEISZLER
FIELD GROUP LEADER: BOB GREGORY

SAMPLE NUMBERS

302

PARAMETERS	STORET # METHOD #	22GW1 374716	22GW2 374717	22GW3 374718
DATE		7/6/84	7/5/84	7/6/84
TIME		830	740	850
T-1,3-DICHL*PROPENE (UG/L)	34699 0	<0.4	<0.6	<0.6
ETHYLBENZENE (UG/L)	34371 0	2900	<1	8
METHYLENE CHLORIDE (UG/L)	34423 0	<0.8	<1	<1
1,1,2,2-TE*CH*ETHANE (UG/L)	34516 0	<0.6	<0.9	<0.9
TETRACHLOROETHENE (UG/L)	34475 0	<1.2	<2.0	<1.9
1,1,1-TRICHL*ETHANE (UG/L)	34506 0	<0.80	<1.3	<1.2
1,1,2-TRICHL*ETHANE (UG/L)	34511 0	<0.80	<1.2	<1.1
TRICHLOROETHENE (UG/L)	39180 0	<1.0	<1.4	<1.4
TRICHL*FLUOROMETHANE (UG/L)	34488 0	<0.9	<1	3
TOLUENE (UG/L)	34010 0	27000	<0.6	10
VINYL CHLORIDE(UG/L)	39175 0	<0.6	<0.9	<0.9
LEAD,TOTAL(UG/L)	1051 0	807.0	<40.0	<40.0
OIL&GR,IR(MG/L)	560 0	<0.9	1	<0.8

Source: ESE, 1984.

Table 2-10. Site 22--Industrial Area Tank Farm Data Evaluation

Analytes Detected	Regulatory Limit*	Value (ug/L)	Samples Exceeding Limit
O&G	*Organoleptic*	NL*	None
Pb	Drinking Water/Ambient Water	50	22GW1
1,2-Dichloropropane	NCA†	NL	NL
12DCLEE	NCA	NL	NL
T-1,2-Dichloroethene	NCA	NL	NL
Benzene	10^{-5} Human Health Risk Level	6.6	22GW1, 22GW3
Chloroform	10^{-5} Human Health Risk Level	1.9	None
Ethylbenzene	10^{-5} Human Health Risk Level	1,400	22GW1
Toluene	10^{-5} Human Health Risk Level	14,300	22GW1
CCL3F	10^{-5} Human Health Risk Level	1.9	22GW3

* NCA = No criteria available.
† NL = No numerical limit.

Source: ESE, 1985.

be derived from the tank farm area. This may be attributed to hydraulic connection of the producing zone(s) of well No. 602 with deeper contaminated zones at the tank farm. The absence of contamination at Well 22GW2 indicates that the migration pathway is deep, not shallow. Of the six organic compounds detected at supply well No. 602 (Well 22GW3), only benzene and CCL3F exceed applicable health criteria/guidelines.

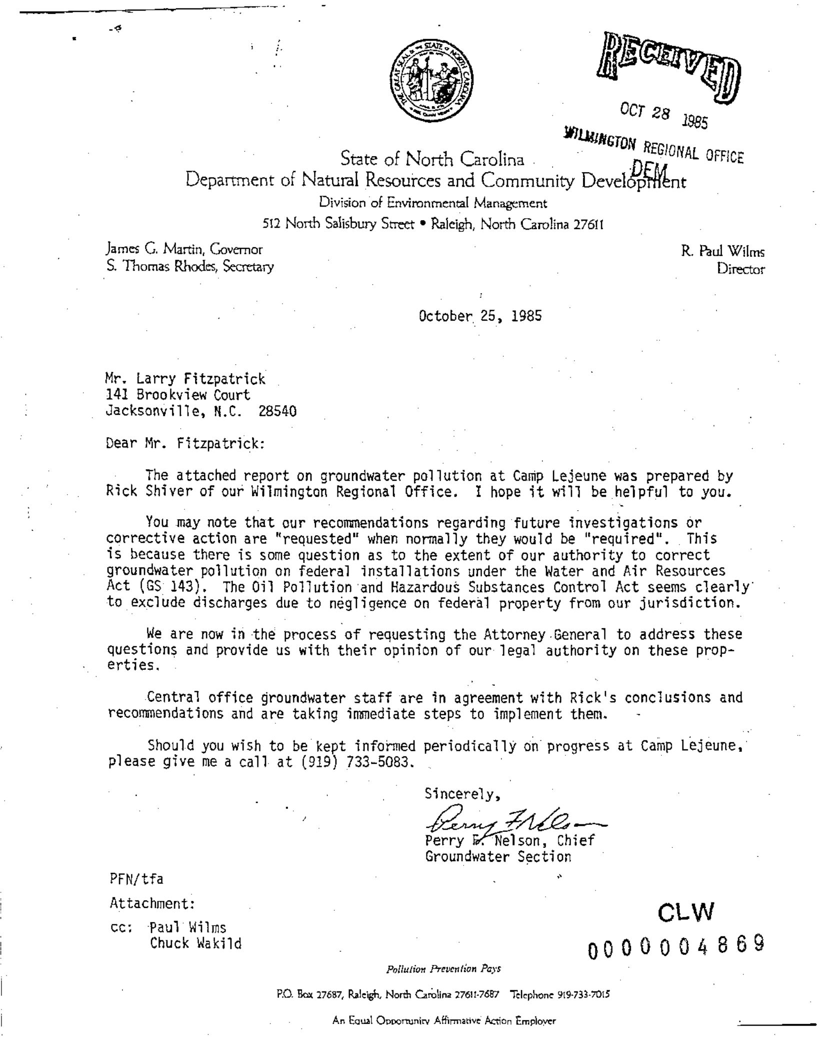
Recommendations

Because the first round of verification sampling and analysis conducted at Site 22 indicated significant contamination of deep water supply well No. 602, it is recommended that no further verification monitoring be performed and that a more intensive characterization monitoring program be developed and implemented. The following sections describe the background of the Site 22 investigation, outline the objectives of the proposed characterization monitoring program, and describe the proposed methodology for implementing the Characterization Study at Site 22.

Background--Water quality sampling at Site 22 conducted by ESE during the Verification Step detected the presence of fuel-derived contaminants (benzene, ethylbenzene, toluene, and lead) in shallow monitor Well 22GW1 and deep water supply well No. 602. Trace quantities of several chlorinated solvents also were identified.

In subsequent sampling by LANTDIV at well No. 602 and others, the levels of chlorinated solvents have increased dramatically, whereas the fuel-derived contaminants have remained relatively constant. These facts suggest that a second plume of contamination, characterized by the presence of chlorinated solvents, has reached well No. 602 subsequent to the Verification Step sampling.

Several potential source areas may exist. The main industrial area is a logical source of solvents, although a specific source was not identified in the Initial Assessment Study (IAS) report.



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State of North Carolina
Department of Natural Resources and Community Development
Division of Environmental Management
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor
S. Thomas Rhodes, Secretary

R. Paul Wilms
Director

October 25, 1985

Mr. Larry Fitzpatrick
141 Brookview Court
Jacksonville, N.C. 28540

Dear Mr. Fitzpatrick:

The attached report on groundwater pollution at Camp Lejeune was prepared by Rick Shiver of our Wilmington Regional Office. I hope it will be helpful to you.

You may note that our recommendations regarding future investigations or corrective action are "requested" when normally they would be "required". This is because there is some question as to the extent of our authority to correct groundwater pollution on federal installations under the Water and Air Resources Act (GS 143). The Oil Pollution and Hazardous Substances Control Act seems clearly to exclude discharges due to negligence on federal property from our jurisdiction.

We are now in the process of requesting the Attorney General to address these questions and provide us with their opinion of our legal authority on these properties.

Central office groundwater staff are in agreement with Rick's conclusions and recommendations and are taking immediate steps to implement them.

Should you wish to be kept informed periodically on progress at Camp Lejeune, please give me a call at (919) 733-5083.

Sincerely,

Perry F. Nelson
Perry F. Nelson, Chief
Groundwater Section

PFN/tfa

Attachment:

cc: Paul Wilms
Chuck Wakild

Pollution Prevention Pays

P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-7015

An Equal Opportunity Affirmative Action Employer

Chronology of Events

The initial assessment study was performed at the MCB from February 1982 to February 1983. Conducted by consultants with Water and Air Research, Inc., the study emphasized groundwater contamination sites. The findings and recommendations were incorporated into an April 1983 document titled Initial Assessment Study of Marine Corps Base Camp Lejeune North Carolina. Although seventy-three (73) contamination sites were identified at the MCB, the investigators concluded that further studies could be justified only at twenty-two (22) priority sites. Figure 1 shows the location of these 73 sites, and Appendix II provides an executive summary of the report.

During July 1984, confirmation studies were begun at eighteen (18) priority sites. The results of these groundwater studies were documented in a report provided to the Marine Corps in February 1985: as the Marine Corps disagrees with the conclusions in this report, it will not release a copy of it to any outside agency. Recently, however, the Marine Corps did agree to provide DEM copies of the technical data for review and interpretation.

As part of this confirmation study, it was recommended that volatile organic analyses (VOA) samples be collected from any community water supply well that is located proximal to a priority site. In July 1984, solvents and gasoline were discovered present in well HP-602, and expanded quality studies eventually verified the presence of organic contaminants in ten (10) wells. The organic contaminants included: tetrachloroethylene, trichloroethylene, dichloroethylene, methylene chloride, 1,1 - dichloroethane, benzene, toluene, and dichlorobenzene. Although no safe drinking water

Sunday - Jan. 27, 1985, 1300.

The operator on duty at the Holcomb Blvd. Water Treatment Plant received two phone calls, one from Paradise Point Officer Quarters and one from Berkley Manor Area, concerning an odor in the water. The operator went out and collected samples from each complaint; he then checked treated water reservoir but could not detect any odor. After the 4-12 operator came on duty, he checked the reservoir and detected a gaslone odor near the auxiliary engines. He notified the Water Plant Operator Foreman, Mr. Byron Frazelle at home. Mr. Frazelle came in and observed the gasoline odor. He then alerted the fire department and official personnel. The reservoir was over flowed for one hour to flush any gasoline that might be floating on top. Then the reservoir was drained of 1,000,000 gallons and hosed down with fire hose for several hours.

Monday - Jan 28, 1985 - the reservoir was refilled, at 1400 plant turned off.

Tuesday - Jan 29, 1985 - the plant was started up, running to waste approximately 42,000 gallons for one hour to collect samples from raw water and filter effluent. After samples were collected, the plant was again cut off. Extensive flusing was started on Monday, Jan. 28th, in the Paradise Point and Berkley Manor Area, flushing also continued on the 29th and 30th. Paradise Pt elevated tank was flushed for one hour on 31st, estimated 100,000 gallons.

Jan 31, 1985 - Samples were collected throughout the plants - Bldg. 20, Bldg. 670 and the distribution systems.

Feb 5, 1985 - the Holcomb Blvd. plant was started up at 1430 , filters were flushed to waste, approximately 300,000 gallons, for approximately three hours, started pumping to distribution at 1600. Reservoir at Bldg. 20 was overflowed to waste for 16 hours beginning at 1600 on Feb 5, 1985, and ending at 0800 Feb. 6, 1985 flushing an estimated 800,000 gallons to waste.

Feb. 6, 1985 - Resumed flushing distribution in the Paradise Point and Berkley Manor Area approximately (200,000 gallons), drained the Paradise Point elevated tank 200,000 gallons.

Feb. 7, 1985 - Continued flushing hydrants and drained Berkley Manor and French Creek elevated tanks 300,000 gallons each.

Feb. 8, 1985 - The Midway Park and Industrial Area elevated tanks are being drained of a total capacity of 500,000 gallons.

This leaves only two tanks to be drained, one in the 5th area and one near Bldg. 3. These tanks will be flushed as soon as possible.

8FEB85
1000 hrs

File - Lab info prepared by E. Betz 2-26-85 1133

CHRONOLOGY

Summer 84	NACIP sampled 22 wells identified as potential problems due to proximity.
30 Nov 84	Received results (ESE study). Well 602 positive for benzene. 602 was shut down and resampled.
4 Dec 84	Sampled Hadnot Point Water Plant (HP) raw and treated water, plus wells 601, 603, 608, 634, 637 and 642 because of their proximity to 602.
6 Dec	Received test results (Table [1]). Wells 601, 602, 608, raw and treated water positive for Trichloroethylene (TCE), trans-1,2-Dichloroethylene (DCE), and Tetrachloroethylene (PCE). Wells 602 and 608 also showed other Volatile Organic Chemicals (VOCs). Wells 601 and 608 were shut down.
10 Dec	Sampled HP treated water, plus Wells 601, 602, 608, 634, 637 and 642
13 Dec	Took Quality Control (QC) samples of 602, split three ways.
13-19 Dec	Took daily samples of HP raw water.
14 Dec	Received results of 10 Dec 84 sampling (Table [2]). Treated water levels dropped. Wells 634 and 637, previously showing nothing, showed significant levels of Methylene Chloride(MC). 634 and 637 were shut down.
19 Dec	Took a distribution sample from HP. Location was FC-540, far point from plant.
21 Dec	Received results of daily HP samples (Table [3]), plus JTCs QC sample and FC-540. The QC samples from JTC and Grainger (received later) confirmed the presence of TCE and DCE.
16 Jan 85	Sampled all operating wells for HP and Holcomb Blvd Water Plant (HB). 37 wells.
23 Jan	Sampled all operating wells for Onslow Beach (OB), Courthouse Bay (CHB), Camp Johnson (CJ) and Tarawa Terrace (TT) water plants. 21 wells.
27 Jan	Base Chief of Staff detected gasoline smell in water in quarters, serviced by Holcomb Blvd plant and reservoir.
27 Jan	Reservoir flushed initially. Later, drained reservoir, shut-down HB plant, scrubbed reservoir with high pressure hoses. Housing areas and mainside are now being served by HP.
29 Jan	Sampled all operating wells for Marine Corps Air Station-New River (MCAS) and Rifle Range (RR). 25 wells.
	Sampled finished water at HB (plant still shut down). Sampled

0158

DEPARTMENT OF THE NAVY FACILITIES ENGINEERING COMMAND

Do Not
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From
Office

APRIL 1983

INITIAL ASSESSMENT STUDY OF MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA

NEESA 13-011

NAVAL ENERGY AND ENVIRONMENTAL
SUPPORT ACTIVITY
Port Hueneme, California 93043

RELEASE OF THIS DOCUMENT REQUIRES PRIOR NOTIFICATION

3. Locations according to streets or other known landmarks; and
4. References to figures which show site location and/or details.

Site locations are referenced to the 1979 edition of the Public Works Development Map (PWDM) which is a set of 24 sheets. Each sheet contains a locator system using a letter and a number to identify a specific grid. Throughout this report, locations are given using the following format: PWDM "sheet number", "grid letter and number." For example, a site situated in grid A17 on sheet 11 of 24 is referenced as PWDM coordinates 11, A17.

2.4.1 Site No. 1: French Creek Liquids Disposal Area. This site (PWDM coordinates 11, C7/D7) has been used intermittently from the late 1940s to the mid-1970s. Liquid wastes from vehicle maintenance were poured on the ground as part of routine operations. Dead batteries were emptied of acid before disposal. Batteries and used battery acid usually were hand carried from maintenance buildings to a disposal point. Sometimes, holes were dug for waste acid disposal; these were immediately refilled with dirt. During oil changes, vehicles were driven to a disposal point before the used oil (or other fluid) was drained and replaced with new oil. Acid and oil disposal areas were not necessarily congruent. Suspected quantities involved are 5,000 to 20,000 gallons of waste POL and 1,000 to 10,000 gallons of battery acid. Comparing these quantities to better documented quantities for a similar site (i.e., Site No. 73) indicates that POL quantity estimates may be low at Site No. 1.

2.4.2 Site No. 2: Former Nursery/Day-Care Center (Building 712). This site is at PWDM coordinates 5, K10. This area had been recently operated as a day care center. From 1945 to 1958, pesticides of various kinds were stored, handled, and dispensed here. Residuals are present but reliable data from which to quantify residuals or spill volumes have not been found. Chemicals used in significant amounts include Chlordane, DDT, Diazinon, and 2,4-D. Stored only or used to a minor extent were Dieldrin, Lindane, Malathion, Silvex, and 2,4,5-T. Contaminated areas are the fenced playground, approximately 6,300 square feet; the mixing pad covering approximately 100 square feet; and the wash pad, approximately 225 square feet. An adjacent drainage ditch possibly received washout and spills. Table 2-1 presents results of a preliminary sampling program in April 1982. Based on test data, the day care activities were ceased in April 1982.

2.4.3 Site No. 6: Storage Lots 201 and 203. This site is at PWDM coordinates 6, F3-4/G3-4/H2-4/I2-4/J3. In the 1940s, the area occupied by Lot 203 was a waste disposal site. In the northeast corner, a site is marked where an unknown quantity of DDT was buried. Attempts to estimate the amount have been unsuccessful. The area where DDT was discharged is assumed to be within an 80- to 100-foot radius of the dump marker. The size of Storage Lots 201 and 203 is approximately 25 and 46 acres, respectively. DDT and transformers containing PCBs were stored her

[redacted]

Cercla 429

01.06-08/01/91-00429

D-33-11-90-9

FINAL
WORK PLAN

FOR SITE INSPECTIONS
AT
SITES 3, 7, 43, 44, 54, 63, 65, 80, AND 82

CAMP LEJEUNE MILITARY RESERVATION
JACKSONVILLE, NORTH CAROLINA

AUGUST 1991

SUBMITTED FOR HALLIBURTON NUS BY:

D. Hutson

DARYL HUTSON
PROJECT MANAGER

APPROVED:

Vicki L. Bomberger

VICKI L. BOMBERGER
PROGRAM MANAGER

6.0 SITE 82: PINEY GREEN ROAD VOC AREA

6.1 SITE HISTORY AND PHYSICAL SETTING

The Piney Green Road VOC Area is a forested area between Lot 203 and Wallace Creek and appears to have been used as a disposal area at some point in the past. It is estimated to be 30 acres in size. There is visual evidence of debris piles and small depressions as identified by ES&E in the Site Summary Report, June 1990. This area is bounded on the northwest by Wallace Creek and is therefore a reasonable source of the observed VOCs in Wallace Creek. The area of investigation is shown in Figure 6-1.

6.2 INITIAL INVESTIGATION

In 1986, ES&E conducted a field investigation of IAS Site 6 which contains Storage Lots 201 and 203. These storage lots are known to have served as storage and waste disposal areas for DDT and transformers. During this same time period, the supply wells on the base were sampled. Trace levels of TCE and other chlorinated alkenes were detected in supply wells 651, 652, and 653. Supply well 652 is located further south and is not shown on Figure 6-1.

In 1986, a soil-gas survey was also performed in the vicinity of Site 6 along Piney Green Road. There was one isolated case of TCE detection southwest of Supply Well 652. Shallow monitoring wells were installed adjacent to the supply wells and the one isolated soil gas hit to determine whether there was a surface source of contamination. No contamination was found in any of the shallow wells; therefore, the source of contamination in the supply wells may be from outside the Wallace Creek area.

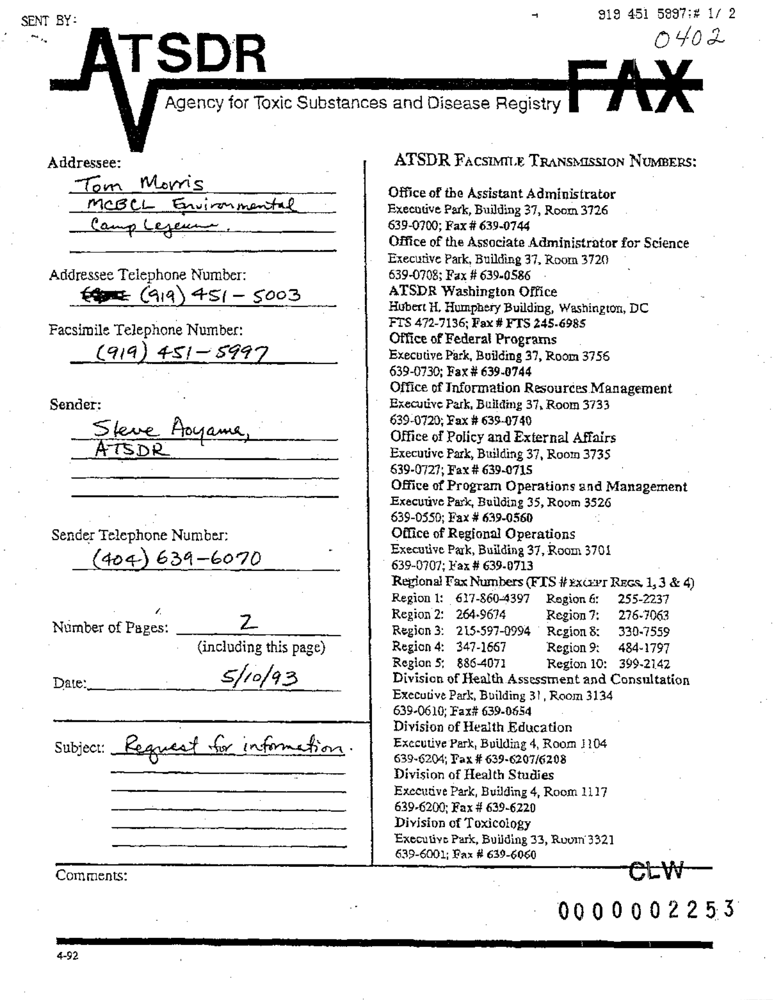
Figures 6-2 and 6-3 present a geological cross section that was developed by ES&E, Site Summary Report (1990) for the Site 6 area. The section shows the site to be underlain by silty sand, sand, and coarse sand. The surface of the shallow groundwater at this site lies within the silty sand at depths ranging from 2 to 15 feet below land surfaced. The groundwater contour map, Figure 6-4, indicates the groundwater flows toward Wallace Creek and Bearhead Creek at a gradient of approximately 0.009 ft/ft.

During the investigation of Site 6, surface water samples were collected from upstream and downstream locations in Wallace Creek, as shown in Figure 6-1. The samples were analyzed for VOCs and the i,p- and p,p-isomers of DDD, DDE, and DDT.

The surface water samples from Wallace Creek contained three VOCs: trichloroethene, vinyl chloride, and trans-1,2-dichloroethene, which were also detected in the supply wells. Table 6-1 provides the results of the analysis. Concentrations of theses constituents were higher in the downstream (6SW2) sample than in the upstream (6SW1).

Sediment samples were collected from the same locations as the surface water samples and analyzed for the same target compounds. Table 6-2 shows that the two Wallace Creek samples did not contain any target analytes above the method detection limits.

The source of VOCs in the surface water of Wallace Creek remains unknown. It appears unlikely that Lot 203, as currently defined, is the source of the three VOCs detected in the upstream and downstream water samples. The area described in Section 6.1 is the most probable source of contamination and the focus of this investigation.



SENT BY: 919 451 5997;# 1/ 2

0402

ATSDR Agency for Toxic Substances and Disease Registry **FAX**

Addressee:
Tom Morris
MCBCL Environmental
Camp Lejeune.

Addressee Telephone Number: (919) 451-5003

Facsimile Telephone Number: (919) 451-5997

Sender:
Steve Aoyama,
ATSDR

Sender Telephone Number: (404) 639-6070

Number of Pages: 2 (including this page)

Date: 5/10/93

Subject: Request for information.

Comments:

ATSDR FACSIMILE TRANSMISSION NUMBERS:

Office of the Assistant Administrator
Executive Park, Building 37, Room 3726
639-0700; **Fax # 639-0744**
Office of the Associate Administrator for Science
Executive Park, Building 37, Room 3720
639-0708; Fax # 639-0586
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Executive Park, Building 31, Room 3134
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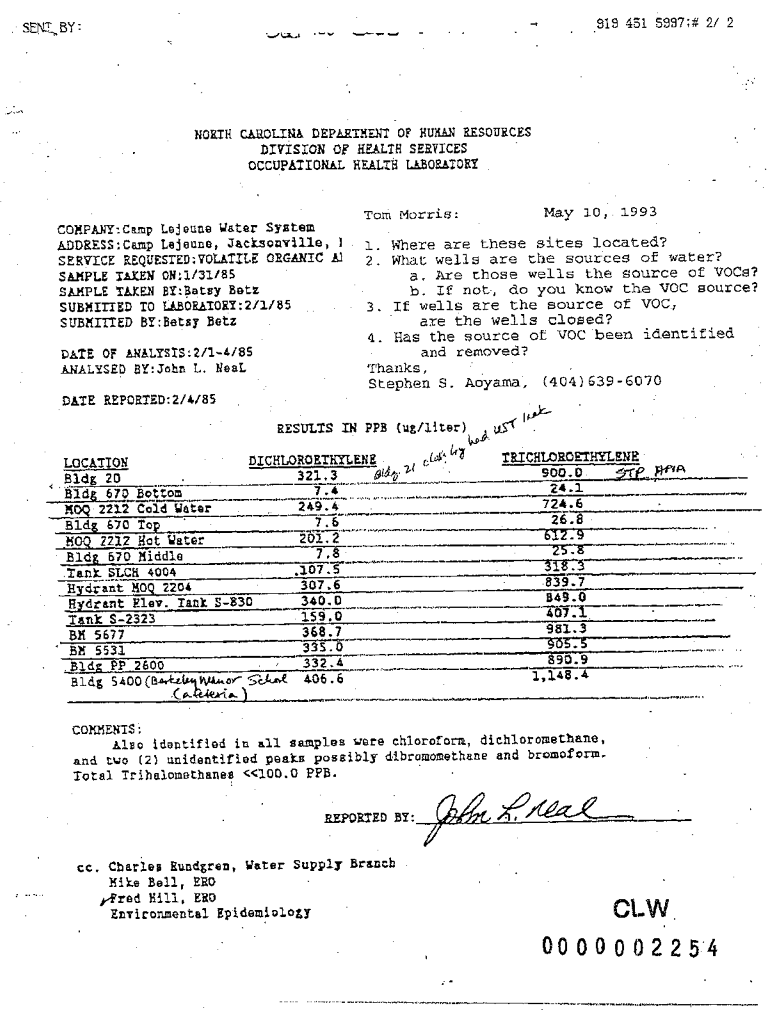
4-92



SENT BY: → 919 451 5997;# 2/ 2

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES
DIVISION OF HEALTH SERVICES
OCCUPATIONAL HEALTH LABORATORY

COMPANY: Camp Lejeune Water System
ADDRESS: Camp Lejeune, Jacksonville,
SERVICE REQUESTED: VOLATILE ORGANIC A
SAMPLE TAKEN ON: 1/31/85
SAMPLE TAKEN BY: Betsy Betz
SUBMITTED TO LABORATORY: 2/1/85
SUBMITTED BY: Betsy Betz

DATE OF ANALYSIS: 2/1-4/85
ANALYSED BY: John L. Neal

DATE REPORTED: 2/4/85

Tom Morris: May 10, 1993

1. Where are these sites located?
2. What wells are the sources of water?
   a. Are those wells the source of VOCs?
   b. If not, do you know the VOC source?
3. If wells are the source of VOC, are the wells closed?
4. Has the source of VOC been identified and removed?

Thanks,
Stephen S. Aoyama, (404)639-6070

RESULTS IN PPB (ug/liter)

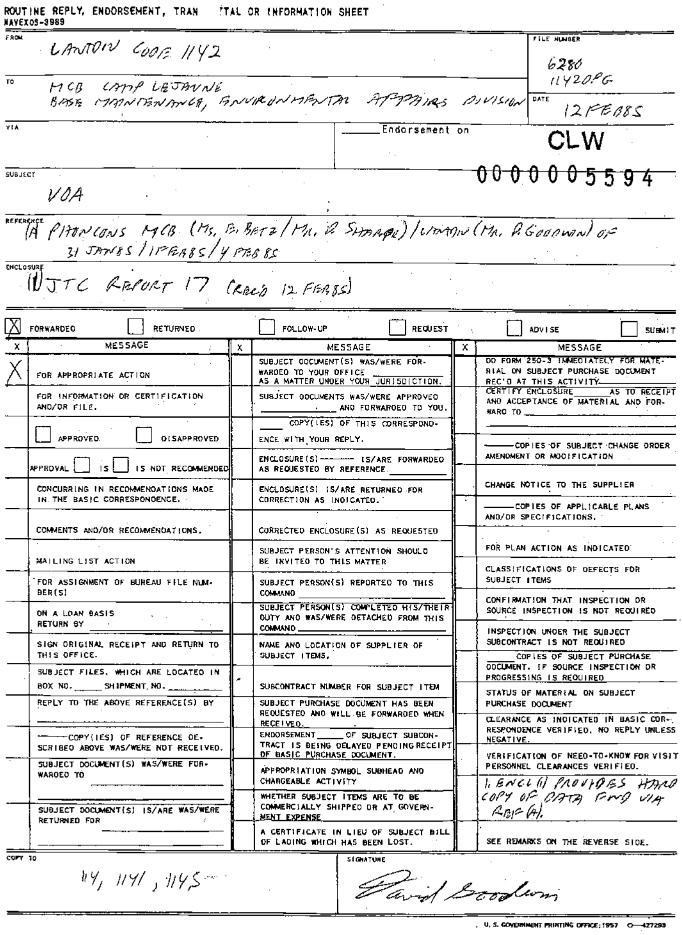
Bldg. 21 close by had UST leak

LOCATION	DICHLOROETHYLENE	TRICHLOROETHYLENE
Bldg 20	321.3	900.0 STP HPIA
Bldg 670 Bottom	7.4	24.1
MOQ 2212 Cold Water	249.4	724.6
Bldg 670 Top	7.6	26.8
MOQ 2212 Hot Water	201.2	612.9
Bldg 670 Middle	7.8	25.8
Tank SLCH 4004	107.5	318.3
Hydrant MOQ 2204	307.6	839.7
Hydrant Elev. Tank S-830	340.0	849.0
Tank S-2323	159.0	407.1
BM 5677	368.7	981.3
BM 5531	335.0	905.5
Bldg PP 2600	332.4	890.9
Bldg 5400 (Berkeley Manor School (cafeteria)	406.6	1,148.4

COMMENTS:
Also identified in all samples were chloroform, dichloromethane, and two (2) unidentified peaks possibly dibromomethane and bromoform. Total Trihalomethanes <<100.0 PPB.

REPORTED BY: John L. Neal

cc. Charles Rundgren, Water Supply Branch
Mike Bell, ERO
✓Fred Hill, ERO
Environmental Epidemiology



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TO MCB CAMP LEJEUNE
BASE MAINTENANCE, ENVIRONMENTAL AFFAIRS DIVISION

FILE NUMBER 6280
1142:PG

DATE 12 FEB 85

VIA

_____ Endorsement on

CLW
0000005594

SUBJECT VOA

REFERENCE (A) PHONCONS MCB (MS. B. BETZ/MR. R. SHARPE)/LANTDIV (MR. R. GOODWIN) OF 31 JAN 85/1 FEB 85/4 FEB 85

ENCLOSURE (1) JTC REPORT 17 (REC'D 12 FEB 85)

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APPROVAL ☐ IS ☐ IS NOT RECOMMENDED
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COMMENTS AND/OR RECOMMENDATIONS.
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SUBJECT FILES, WHICH ARE LOCATED IN BOX NO. _____ SHIPMENT NO. _____
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X | MESSAGE

SUBJECT DOCUMENT(S) WAS/WERE FORWARDED TO YOUR OFFICE _____ AS A MATTER UNDER YOUR JURISDICTION.
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_____ COPY(IES) OF THIS CORRESPONDENCE WITH YOUR REPLY.
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SUBJECT PERSON(S) REPORTED TO THIS COMMAND _____
SUBJECT PERSON(S) COMPLETED HIS/THEIR DUTY AND WAS/WERE DETACHED FROM THIS COMMAND _____
NAME AND LOCATION OF SUPPLIER OF SUBJECT ITEMS.
SUBCONTRACT NUMBER FOR SUBJECT ITEM
SUBJECT PURCHASE DOCUMENT HAS BEEN REQUESTED AND WILL BE FORWARDED WHEN RECEIVED.
ENDORSEMENT _____ OF SUBJECT SUBCONTRACT IS BEING DELAYED PENDING RECEIPT OF BASIC PURCHASE DOCUMENT.
APPROPRIATION SYMBOL SUBHEAD AND CHARGEABLE ACTIVITY
WHETHER SUBJECT ITEMS ARE TO BE COMMERCIALLY SHIPPED OR AT GOVERNMENT EXPENSE
A CERTIFICATE IN LIEU OF SUBJECT BILL OF LADING WHICH HAS BEEN LOST.

X | MESSAGE

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CHANGE NOTICE TO THE SUPPLIER
_____ COPIES OF APPLICABLE PLANS AND/OR SPECIFICATIONS.
FOR PLAN ACTION AS INDICATED
CLASSIFICATIONS OF DEFECTS FOR SUBJECT ITEMS
CONFIRMATION THAT INSPECTION OR SOURCE INSPECTION IS NOT REQUIRED
INSPECTION UNDER THE SUBJECT SUBCONTRACT IS NOT REQUIRED
_____ COPIES OF SUBJECT PURCHASE DOCUMENT, IF SOURCE INSPECTION OR PROGRESSING IS REQUIRED
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CLEARANCE AS INDICATED IN BASIC CORRESPONDENCE VERIFIED, NO REPLY UNLESS NEGATIVE.
VERIFICATION OF NEED-TO-KNOW FOR VISIT PERSONNEL CLEARANCES VERIFIED.
1. ENCL (1) PROVIDES HARD COPY OF DATA FWD VIA REF (A).
SEE REMARKS ON THE REVERSE SIDE.

COPY TO 114, 1141, 1145

SIGNATURE David Goodwin

U. S. GOVERNMENT PRINTING OFFICE: 1957 O—427293

Navy Sample 651 received 1-18-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. V0ASPL432 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0414 #651

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2-2-85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	386 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	187 ~~N.D.~~	87V trichloroethylene	3200 ~~N.D.~~
30V 1,2-trans-dichloroethylene	3400 ~~N.D.~~	88V vinyl chloride	655 ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

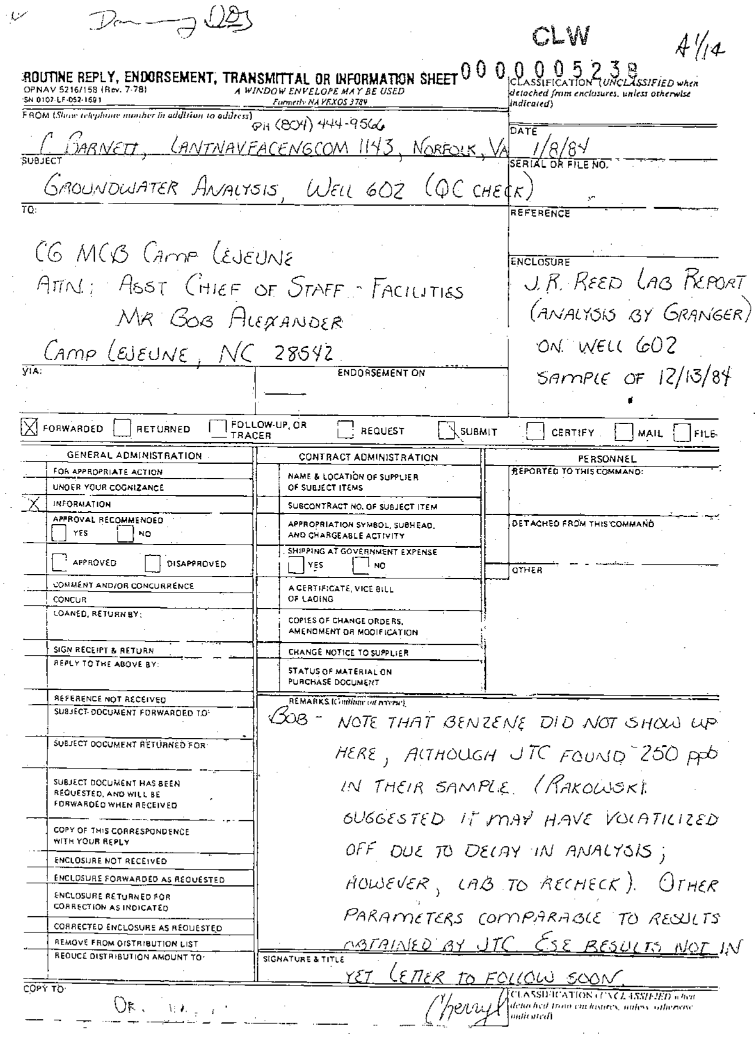
VOLATILE ORGANIC CHEMICAL ANALYSIS REPORTS

STORED AT
ENVIRONMENTAL MANAGEMENT DEPARTMENT'S LABORATORY

LOCATED AT BLDG 65

COMMENTS

1. NAVY SAMPLE ID # REFERS TO CAMP LEJEUNE BUILDING NUMBERS.
2. SAMPLING DATES ARE NOTED ON REPORTS.
3. ALL SAMPLING DONE PRIOR TO DECEMBER 1984, WAS DONE UNDER THE NACIP PROGRAM AND IS NOT PART OF THE LABORATORY'S RECORD.
4. THE MAJORITY OF THE REQUESTED DATA FOR THIS SECTION THAT WAS PART OF LABORATORY'S RECORD COULD NOT BE LOCATED. THE TIME PERIOD IS BEYOND NAVY RECORD RETENTION TIMES.



CLW A1/14

00000005238

ROUTINE REPLY, ENDORSEMENT, TRANSMITTAL OR INFORMATION SHEET

OPNAV 5216/158 (Rev. 7-78)
SN 0107-LF-052-1691

A WINDOW ENVELOPE MAY BE USED
Formerly NAVEXOS 3789

CLASSIFICATION (*UNCLASSIFIED when detached from enclosures, unless otherwise indicated*)

FROM (*Show telephone number in addition to address*): PH (804) 444-9566
C Barnett, LANTNAVFACENGCOM 1143, Norfolk, VA

DATE: 1/8/84

SUBJECT: Groundwater Analysis, Well 602 (QC Check)

SERIAL OR FILE NO.:

TO:
CG MCB Camp Lejeune
Attn: Asst Chief of Staff - Facilities
Mr Bob Alexander
Camp Lejeune, NC 28542

REFERENCE:

ENCLOSURE:
J. R. Reed Lab Report
(Analysis by Granger)
on Well 602
Sample of 12/13/84

VIA:

ENDORSEMENT ON:

☒ FORWARDED ☐ RETURNED ☐ FOLLOW-UP, OR TRACER ☐ REQUEST ☐ SUBMIT ☐ CERTIFY ☐ MAIL ☐ FILE

GENERAL ADMINISTRATION
- FOR APPROPRIATE ACTION
- UNDER YOUR COGNIZANCE
- X INFORMATION
- APPROVAL RECOMMENDED ☐ YES ☐ NO
- ☐ APPROVED ☐ DISAPPROVED
- COMMENT AND/OR CONCURRENCE
- CONCUR
- LOANED, RETURN BY:
- SIGN RECEIPT & RETURN
- REPLY TO THE ABOVE BY:
- REFERENCE NOT RECEIVED
- SUBJECT DOCUMENT FORWARDED TO:
- SUBJECT DOCUMENT RETURNED FOR
- SUBJECT DOCUMENT HAS BEEN REQUESTED, AND WILL BE FORWARDED WHEN RECEIVED
- COPY OF THIS CORRESPONDENCE WITH YOUR REPLY
- ENCLOSURE NOT RECEIVED
- ENCLOSURE FORWARDED AS REQUESTED
- ENCLOSURE RETURNED FOR CORRECTION AS INDICATED
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- SHIPPING AT GOVERNMENT EXPENSE ☐ YES ☐ NO
- A CERTIFICATE, VICE BILL OF LADING
- COPIES OF CHANGE ORDERS, AMENDMENT OR MODIFICATION
- CHANGE NOTICE TO SUPPLIER
- STATUS OF MATERIAL ON PURCHASE DOCUMENT

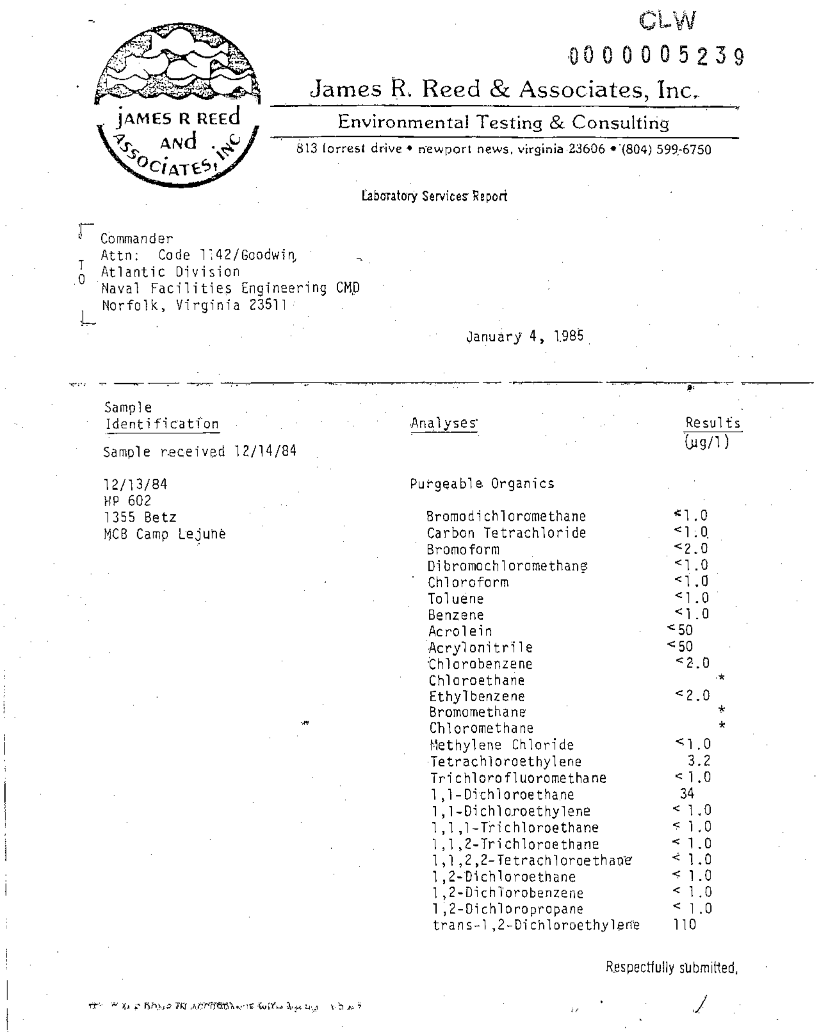
PERSONNEL
- REPORTED TO THIS COMMAND:
- DETACHED FROM THIS COMMAND
- OTHER

REMARKS (*Continue on reverse*):
Bob - Note that benzene did not show up here, although JTC found ~250 ppb in their sample. (Rakowski suggested it may have volatilized off due to delay in analysis; however, lab to recheck). Other parameters comparable to results obtained by JTC. ESE results not in yet. Letter to follow soon.

SIGNATURE & TITLE:
Cheryl

COPY TO:
Dr. [illegible]

CLASSIFICATION (*UNCLASSIFIED when detached from enclosures, unless otherwise indicated*)



JAMES R REED AND ASSOCIATES, INC
James R. Reed & Associates, Inc.
Environmental Testing & Consulting
813 forrest drive • newport news, virginia 23606 • (804) 599-6750

Laboratory Services Report

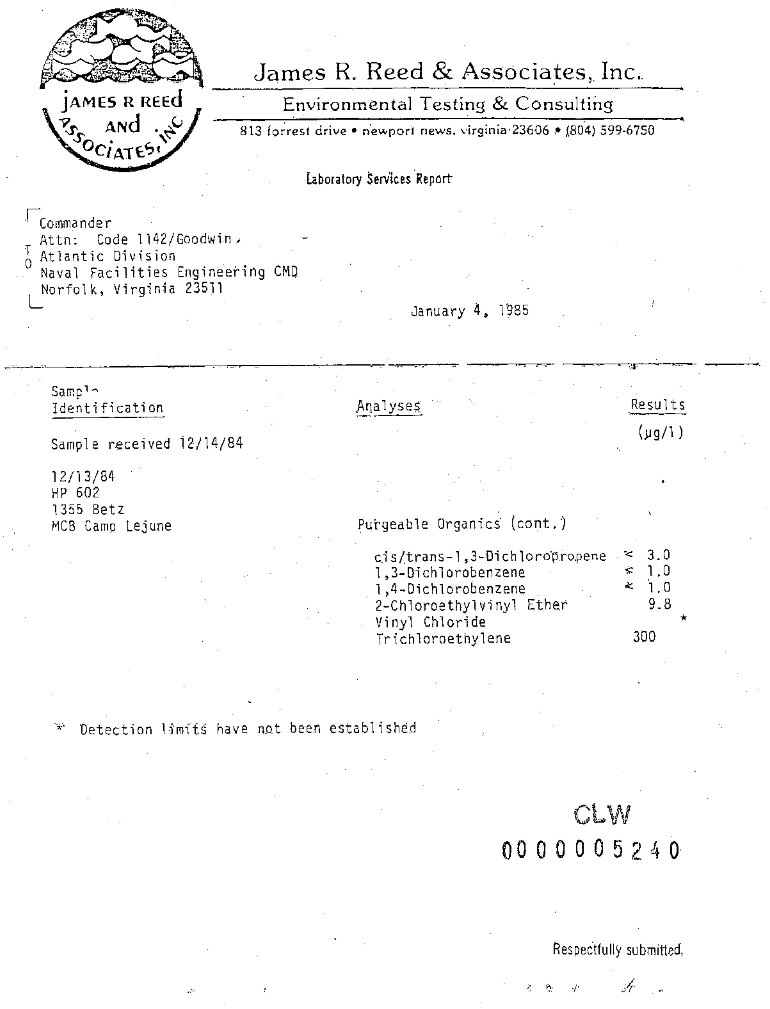
TO
Commander
Attn: Code 1142/Goodwin
Atlantic Division
Naval Facilities Engineering CMD
Norfolk, Virginia 23511

January 4, 1985

Sample Identification	Analyses	Results (µg/l)
Sample received 12/14/84		
12/13/84 HP 602 1355 Betz MCB Camp Lejune	Purgeable Organics	
	Bromodichloromethane	<1.0
	Carbon Tetrachloride	<1.0
	Bromoform	<2.0
	Dibromochloromethane	<1.0
	Chloroform	<1.0
	Toluene	<1.0
	Benzene	<1.0
	Acrolein	<50
	Acrylonitrile	<50
	Chlorobenzene	<2.0
	Chloroethane	*
	Ethylbenzene	<2.0
	Bromomethane	*
	Chloromethane	*
	Methylene Chloride	<1.0
	Tetrachloroethylene	3.2
	Trichlorofluoromethane	<1.0
	1,1-Dichloroethane	34
	1,1-Dichloroethylene	<1.0
	1,1,1-Trichloroethane	<1.0
	1,1,2-Trichloroethane	<1.0
	1,1,2,2-Tetrachloroethane	<1.0
	1,2-Dichloroethane	<1.0
	1,2-Dichlorobenzene	<1.0
	1,2-Dichloropropane	<1.0
	trans-1,2-Dichloroethylene	110

Respectfully submitted,

[illegible]



James R. Reed & Associates, Inc.
Environmental Testing & Consulting
813 forrest drive • newport news, virginia 23606 • (804) 599-6750

Laboratory Services Report

TO
Commander
Attn: Code 1142/Goodwin
Atlantic Division
Naval Facilities Engineering CMD
Norfolk, Virginia 23511

January 4, 1985

Sample Identification	Analyses	Results (µg/l)
Sample received 12/14/84		
12/13/84 HP 602 1355 Betz MCB Camp Lejune	Purgeable Organics (cont.)	
	cis/trans-1,3-Dichloropropene	< 3.0
	1,3-Dichlorobenzene	< 1.0
	1,4-Dichlorobenzene	< 1.0
	2-Chloroethylvinyl Ether	9.8
	Vinyl Chloride	*
	Trichloroethylene	300

* Detection limits have not been established

CLW
0000005240

Respectfully submitted,

REPORT # 29
LABORATORY ANALYSIS ON
NAVAL SAMPLES
(A/E Contract N62470-84-B-6932
JTC REPORT # 85-052

PREPARED FOR:
DEPARTMENT OF NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VA 23511

PREPARED BY:
JTC ENVIRONMENTAL CONSULTANTS, INC.
4 RESEARCH PLACE, SUITE L-10
ROCKVILLE, MARYLAND 20850
February 14, 1985

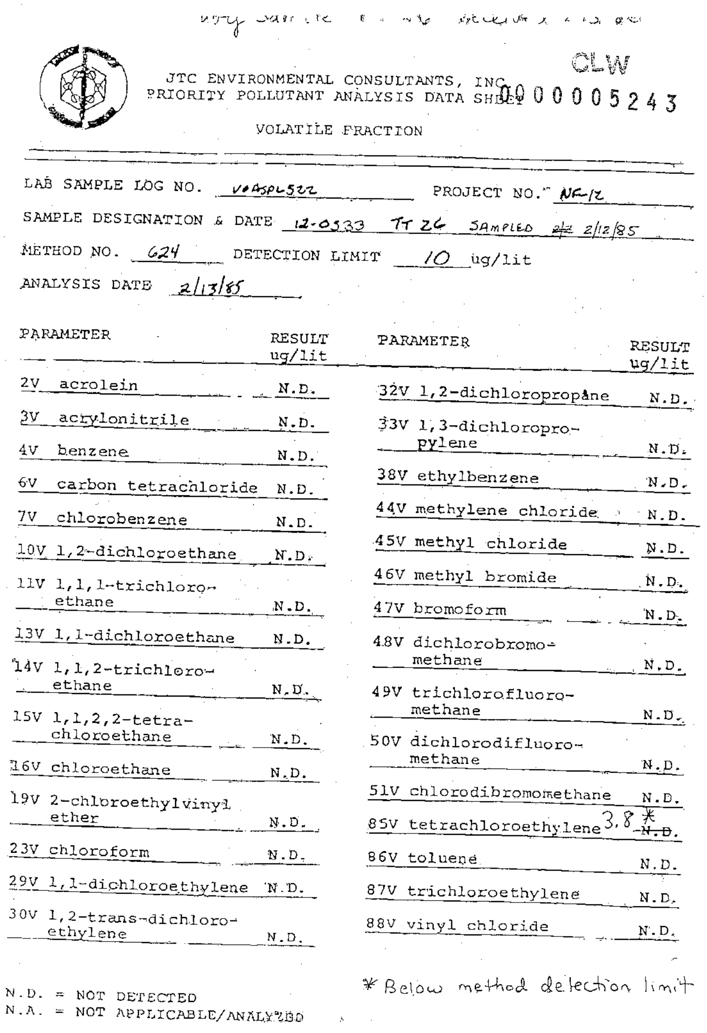
Ann E. Rosecrance
Ann E. Rosecrance
Laboratory Director

JTC Environmental Consultants, Inc.

Date 2-14-85 Report No 29 to Naval Facilities Engineering Command, Norfolk Virginia

JTC Data Report No. 85-052 Table 1 Date of Sample Receipt 2-13-85

NAVY SAMPLE ID	JTC SAMPLE ID	ANALYSIS PARAMETER							
		VOA							
TT26	12-0533	See attached sheets							
TT Treated	12-0534	"							
TT NewWell	12-0535	"							



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CLW

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

000005243

VOLATILE FRACTION

LAB SAMPLE LOG NO. V0ASPL522 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0533 TT 26 SAMPLED ~~2/~~ 2/12/85

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2/13/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	3.8 * ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* Below method detection limit

[illegible]

CLW
000005244

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 521 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0534 TT Treated 2/12/85

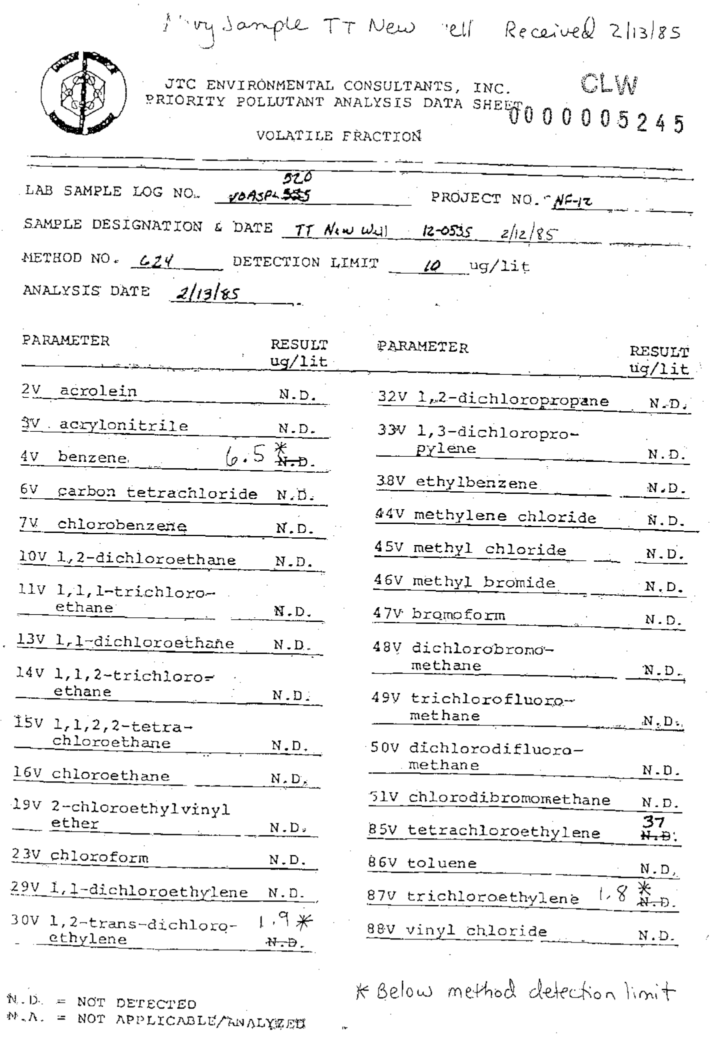
METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2/13/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	2.4* ~~N.D.~~
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	2.3* ~~N.D.~~
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	3.7* ~~N.D.~~
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* Below method detection limit



vy Sample TT New ell Received 2/13/85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

CLW
0000005245

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL ~~535~~ 520 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE TT New Well 12-0535 2/12/85

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2/13/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	6.5 * ~~N.D.~~	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	37 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	1.8 * ~~N.D.~~
30V 1,2-trans-dichloroethylene	1.9 * ~~N.D.~~	88V vinyl chloride	N.D.

* Below method detection limit

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

REPORT # 37
LABORATORY ANALYSIS ON
NAVAL SAMPLES
(A/E Contract N62470-84-B-6932
JTC REPORT # 85-072

PREPARED FOR:
DEPARTMENT OF NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VA 23511

PREPARED BY:
JTC ENVIRONMENTAL CONSULTANTS, INC.
4 RESEARCH PLACE, SUITE L-10
ROCKVILLE, MARYLAND 20850

MARCH 1, 1985

Ann E. Rosecrance
Ann E. Rosecrance
Laboratory Director

JTC Environmental Consultants, Inc.

Date 3-1-85 Report No. 37 to Naval Facilities Engineering Command, Norfolk, Virginia

JTC Data Report No. 85-072 Table 1 Date of Sample Receipt 2-22-85

SAMPLED 2-19-85

NAVY SAMPLE ID	JTC SAMPLE ID	ANALYSIS PARAMETER							
		VOA							
TT 26	12-0596	See attached Sheet							
TT Finished	12-0597	"							
TT New Well	12-0598	"							

avy sample TT26 ceived 2-22-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOA5PL561 PROJECT NO. NF-12
SAMPLE DESIGNATION & DATE 12-0596 TT26
METHOD NO. 624 DETECTION LIMIT 10 ug/lit
ANALYSIS DATE 2/22/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	64 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	4,1 ~~N.D.~~
30V 1,2-trans-dichloroethylene	9,5 ~~N.D.~~	88V vinyl chloride	N.D.

GLW

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

lavy sample TT Finish - received 2-22-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL562 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0597 TT Finished

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2/22/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	3.7 ~~N.D.~~
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	3.3 ~~N.D.~~
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	6.2 ~~N.D.~~
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

OLW

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

Navy sample TT New ell received 2-22-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. V0ASPL563 PROJECT NO. NF-12
SAMPLE DESIGNATION & DATE 12-0598 TT New Well
METHOD NO. 624 DETECTION LIMIT 10 ug/lit
ANALYSIS DATE 2/22/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	6.3 ~~N.D.~~	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	13 ~~N.D.~~	88V vinyl chloride	N.D.

CLW

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

REPORT # 26
LABORATORY ANALYSIS ON
NAVAL SAMPLES
(A/E Contract N62470-84-B-6932
JTC REPORT # 85-080

PREPARED FOR:
DEPARTMENT OF NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VA 23511

PREPARED BY:
JTC ENVIRONMENTAL CONSULTANTS, INC.
4 RESEARCH PLACE, SUITE L-10
ROCKVILLE, MARYLAND 20850

MARCH 8, 1985

Ann E. Rosecrance
Ann E. Rosecrance
Laboratory Director

JTC Environmental Consultants, Inc.

Date 3/7/85 Report No. 26 to Naval Facilities Engineering Command, Norfolk Virginia

JTC Data Report No. 85-080 Table 1 Date of Sample Receipt 2-7-85

NAVY SAMPLE ID	JTC SAMPLE ID	ANALYSIS PARAMETER							
		VOA							
602	12-0496	See attached sheet	SAMPLED 2/4/85						
608	12-0497	"							
610	12-0498	"							
645-5	12-0499	"							
649-3	12-0500	"							
651	12-0501	"							
651	12-0502	"							
654	12-0503	"							
AS 191	12-0504	"	SAMPLED 2/5/85						
AS 203	12-0505	"							
HB 670 Filter 1	12-0506	"							
HB 670 Filter 2	12-0507	"							
HP20	12-0508	"							
HCAS AS 110	12-0509	"							
MP M-178	12-0510	"							
TT STT 39A	12-0511	"							

Navy Sam # 602 Received 2-7-85

CLW

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET 0000005253

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 523 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0496 #602

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2-13-85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	1.5* ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	38 ~~N.D.~~
30V 1,2-trans-dichloroethylene	74 ~~N.D.~~	88V vinyl chloride	N.D.

* Below method detection limit

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

Client Report No. 26
JTC Report No. 85-080

TENTATIVELY IDENTIFIED COMPOUNDS

Laboratory Sample ID 12-0496 Client Sample ID 602

COMPOUND	ESTIMATED CONCENTRATION
butane	8.4 ug/L
pentane	2.2 "
2-methyl butane	3.1 "

Navy Samp # 608 Received 2-7-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 528 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0497 #608

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2-13-85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	1.6* ~~N.D.~~	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	9.0* ~~N.D.~~
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

* Below method detection limit

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

Navy Samp # 610 Received 2/7/85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 527 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0498 #610

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2/13/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

Navy Samp # 645-5 Received 2/7/85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 542 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0499 645-5

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2/19/85

PARAMETER	RESULT ug/lit.	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

N.D. - NOT DETECTED
N.A. - NOT APPLICABLE/ANALYZED

Navy 5 [illegible] # 649-3 [illegible] 1/85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 544 PROJECT NO. NF-12

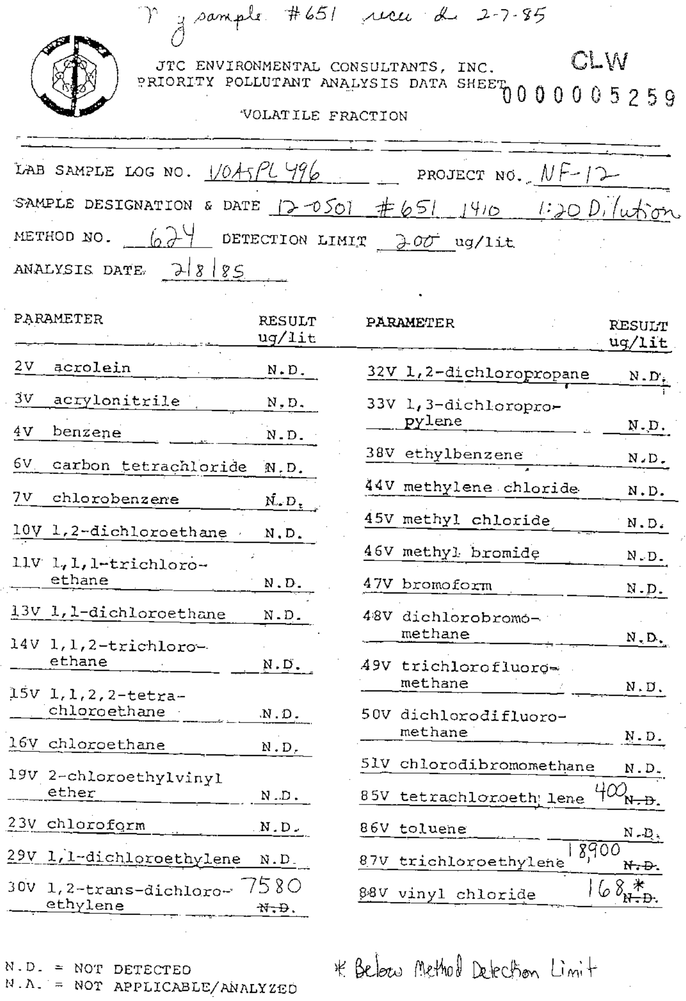
SAMPLE DESIGNATION & DATE 12-0500 649-3

METHOD NO. 624 DETECTION LIMIT 10 ug/lit.

ANALYSIS DATE 2/20/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	N.D.
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	N.D.	88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE



r g sample #651 recd 2-7-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

CLW
0000005259

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOA5PL 496 PROJECT NO. NF-12
SAMPLE DESIGNATION & DATE 12-0501 #651 1410 1:20 Dilution
METHOD NO. 624 DETECTION LIMIT 200 ug/lit
ANALYSIS DATE 2/8/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	400 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	18900 ~~N.D.~~
30V 1,2-trans-dichloroethylene	7580 ~~N.D.~~	88V vinyl chloride	168* ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* Below Method Detection Limit

[illegible] sample #651 recu [illegible] 2-7-85

Referenced

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

CLW
0000005259

VOLATILE FRACTION

OG NO. V0A5PL 496 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0501 #651 1410 1:20 Dilution

METHOD NO. 624 DETECTION LIMIT 200 ug/lit

ANALYSIS DATE 2/8/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	400 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	18,900 ~~N.D.~~
30V 1,2-trans-dichloroethylene	7580 ~~N.D.~~	88V vinyl chloride	168* ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* Below Method Detection Limit

lavy sample [illegible] received 2-1-85

referenced

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

CLW

VOLATILE FRACTION

0000005269

LOG NO. VOBSPL 509 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0511 TT STT 39A

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2/11/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	7.2 * ~~N.D.~~
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	2.0 * ~~N.D.~~
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	11 ~~N.D.~~
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	215 ~~N.D.~~
23V chloroform	2.0 * ~~N.D.~~	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	8.0 * ~~N.D.~~
30V 1,2-trans-dichloroethylene	12 ~~N.D.~~	88V vinyl chloride	N.D.

* Below method detection limit

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

REPORT # 19
LABORATORY ANALYSIS ON
NAVAL SAMPLES

(A/E Contract N6270-84-B-6932
JTC REPORT # 85-047

PREPARED FOR:
DEPARTMENT OF NAVY
ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VA 23511

PREPARED BY:
JTC ENVIRONMENTAL CONSULTANTS, INC.
4 RESEARCH PLACE, SUITE L-10
ROCKVILLE, MARYLAND 20850

Ann E. Rosecrance
Ann E. Rosecrance
Laboratory Director

Navy sample TT26 received 1-25-85

Referenced

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

OG NO. VOASPL 469 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0433 TT26

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2-5-85

PARAMETER	RESULT ug/lit
2V acrolein	N.D.
3V acrylonitrile	N.D.
4V benzene	N.D.
6V carbon tetrachloride	N.D.
7V chlorobenzene	N.D.
10V 1,2-dichloroethane	N.D.
11V 1,1,1-trichloroethane	N.D.
13V 1,1-dichloroethane	N.D.
14V 1,1,2-trichloroethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.
16V chloroethane	N.D.
19V 2-chloroethylvinyl ether	N.D.
23V chloroform	N.D.
29V 1,1-dichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	92 ~~N.D.~~

PARAMETER	RESULT ug/lit
32V 1,2-dichloropropane	N.D.
33V 1,3-dichloropropylene	N.D.
38V ethylbenzene	N.D.
44V methylene chloride	N.D.
45V methyl chloride	N.D.
46V methyl bromide	N.D.
47V bromoform	N.D.
48V dichlorobromomethane	N.D.
49V trichlorofluoromethane	N.D.
50V dichlorodifluoromethane	N.D.
51V chlorodibromomethane	N.D.
85V tetrachloroethylene	1580 ~~N.D.~~
86V toluene	N.D.
87V trichloroethylene	57 ~~N.D.~~
88V vinyl chloride	27 ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

avg sample TT new well   received 1-25-85

Referenced

ENVIRONMENTAL CONSULTANTS, INC.
TY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 478   PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0439 TT new well

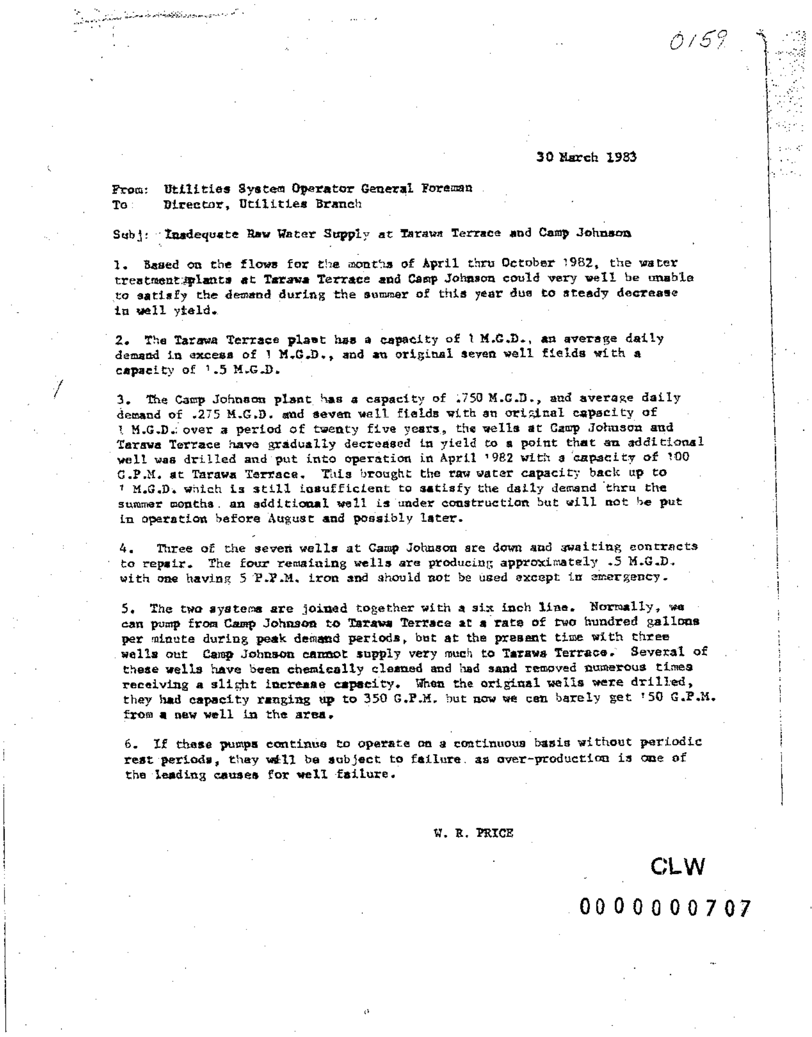
METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2-6-85

PARAMETER	RESULT ug/lit
2V acrolein	N.D.
3V acrylonitrile	N.D.
4V benzene	N.D.
6V carbon tetrachloride	N.D.
7V chlorobenzene	N.D.
10V 1,2-dichloroethane	N.D.
11V 1,1,1-trichloroethane	N.D.
13V 1,1-dichloroethane	N.D.
14V 1,1,2-trichloroethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.
16V chloroethane	N.D.
19V 2-chloroethylvinyl ether	N.D.
23V chloroform	N.D.
29V 1,1-dichloroethylene	N.D.
30V 1,2-trans-dichloroethylene	11 ~~N.D.~~

PARAMETER	RESULT ug/lit
32V 1,2-dichloropropane	N.D.
33V 1,3-dichloropropylene	N.D.
38V ethylbenzene	N.D.
44V methylene chloride	N.D.
45V methyl chloride	N.D.
46V methyl bromide	N.D.
47V bromoform	N.D.
48V dichlorobromomethane	N.D.
49V trichlorofluoromethane	N.D.
50V dichlorodifluoromethane	N.D.
51V chlorodibromomethane	N.D.
85V tetrachloroethylene	132 ~~N.D.~~
86V toluene	N.D.
87V trichloroethylene	5.8 ~~N.D.~~
88V vinyl chloride	N.D.

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED



30 March 1983

From: Utilities System Operator General Foreman
To Director, Utilities Branch

Subj: Inadequate Raw Water Supply at Tarawa Terrace and Camp Johnson

1. Based on the flows for the months of April thru October 1982, the water treatment plants at Tarawa Terrace and Camp Johnson could very well be unable to satisfy the demand during the summer of this year due to steady decrease in well yield.

2. The Tarawa Terrace plant has a capacity of 1 M.G.D., an average daily demand in excess of 1 M.G.D., and an original seven well fields with a capacity of 1.5 M.G.D.

3. The Camp Johnson plant has a capacity of .750 M.G.D., and average daily demand of .275 M.G.D. and seven well fields with an original capacity of 1 M.G.D. over a period of twenty five years, the wells at Camp Johnson and Tarawa Terrace have gradually decreased in yield to a point that an additional well was drilled and put into operation in April 1982 with a capacity of 100 G.P.M. at Tarawa Terrace. This brought the raw water capacity back up to 1 M.G.D. which is still insufficient to satisfy the daily demand thru the summer months. an additional well is under construction but will not be put in operation before August and possibly later.

4. Three of the seven wells at Camp Johnson are down and awaiting contracts to repair. The four remaining wells are producing approximately .5 M.G.D. with one having 5 P.P.M. iron and should not be used except in emergency.

5. The two systems are joined together with a six inch line. Normally, we can pump from Camp Johnson to Tarawa Terrace at a rate of two hundred gallons per minute during peak demand periods, but at the present time with three wells out Camp Johnson cannot supply very much to Tarawa Terrace. Several of these wells have been chemically cleaned and had sand removed numerous times receiving a slight increase capacity. When the original wells were drilled, they had capacity ranging up to 350 G.P.M. but now we can barely get 150 G.P.M. from a new well in the area.

6. If these pumps continue to operate on a continuous basis without periodic rest periods, they will be subject to failure. as over-production is one of the leading causes for well failure.

W. R. PRICE

0203

HEADQUARTERS, MARINE CORPS BASE, CAMP LEJEUNE

ACTION BRIEF Date: 1 MAR 1985

Staff Section: Assistant Chief of Staff, Facilities

Subj: ALTERNATIVES FOR PROVIDING WATER TO THE TARAWA TERRACE AREA

Problem: Because of the recent shutdown of two water wells in the Tarawa Terrace water system due to the presence of Volatile Organic Chemicals (VOC) in the raw water, sufficient well capacity is not expected to be available to satisfy water demand this summer. A shortage of 300,000 gpd (gallons per day) is expected this spring/summer if the present situation remains unchanged.

Background/Discussion: The following alternatives are listed as possible options for addressing the problem.

a. Alternative 1: New well, Tarawa Terrace. Estimated cost: $80,000.

Advantages: Increase capacity by 100 gpm to 250 gpm (gallons per minute).

Disadvantages: Based on recent new wells and test wells in Tarawa Terrace, water in significant quantitities is difficult to locate (e.g., well TT-25 is producing approximately 100 gpm although designed for 150 gpm. New well would be abandoned after completion of expansion of Holcomb Blvd plant in approximately two years. Wells in Montford Point area are high in iron content. Construction of a new well by spring is questionable but could possibly be completed.

b. Alternative 2: Transport water via tanker trucks from other Camp Lejeune plants. Assume hauling 300,000 gpd with 5,000 gallon tankers which would require 60 trips per day. Assuming a tanker can make 12 trips per day, a total of five tanker trucks would be required. Estimated cost: $2,000 per day.

Advantages: Timely method of providing water.

Disadvantages: Logistics of loading/unloading/transporting; nonavailability of trucks.

c. Alternative 3: Tap to City of Jacksonville water line on Lejeune Blvd. Informal discussion with city officials indicates they probably could not provide 300,000 gpd at this time. No costs for taps or rates were quoted. A water line under Lejeune Blvd would have to be constructed. Estimated cost: Unknown.

Advantages: Timely response to problem, if available.

Subj: ALTERNATIVES FOR PROVIDING WATER TO THE TARAWA TERRACE AREA

Disadvantages: Problems associated with connecting separate systems. Chance of requests for reciprocating favors from the City of Jacksonville would increase. VOCs in the city system could be higher than we are now facing.

d. Alternative 4: Change schedule of Holcomb Blvd plant contract to construct the water line to Tarawa Terrace immediately. The expansion of the Holcomb Blvd plant includes running a water line to TT and Camp Johnson. Contract has been awarded. Estimated cost: Unknown (additional cost to contractor).

Advantages: No unnecessary construction would be required.

Disadvantages: Serious doubts exist that contractor would complete line prior to high usage months. Line serving Tarawa Terrace is a 16" submerged line across Northeast Creek.

e. Alternative 5: Construct 8" water line from Brewster Blvd to Tarawa Terrace. Line could be tied to the railroad trestle to cross Northeast Creek. Estimated cost: $75,000.

Advantages: Timely response to problem.

Disadvantages: Problems related to material procurement and construction could surface. The temporary line may require State approval. Pressures and elevations of the two systems have been investigated to determine feasibility.

f. Alternative 6: Modify Tarawa Terrace plant to include aeration or granular activated carbon (GAC) capable of removing VOCs. Estimated cost: $300,000.

Advantages: Removal of VOCs would eliminate the problem.

Disadvantages: The modifications could not be made in the time frame required. The Tarawa Terrace plant will be discontinued upon completion of Holcomb Blvd plant expansion.

g. Alternative 7: Turn on contaminated wells that have been shut down if required to maintain adequate water levels. Estimated cost: None.

Advantages: Adequate quantity of water could be provided.

Disadvantages: Although no maximum contaminate levels have been set for VOCs and no regulations presently prevent using water containing VOCs, the potential health hazards must be weighed against the need and cost of providing water from other sources.

Subj: ALTERNATIVES FOR PROVIDING WATER TO THE TARAWA TERRACE AREA.

Recommended Action: Alternative 5, construct 8" line from Brewster Blvd to Tarawa Terrace. Preliminary engineering study indicates this would provide approximately 250 gpm (360,000 gpd).

Advantages:

(1) Timely - target date for completion 1 June 1985.

(2) Availability of water - can draw from Holcomb Blvd and Hadnot Point system.

(3) Auxiliary line for future use during repair/maintenance of other system.

(4) Minimum cost.

(5) Potential future use to return raw water from Tarawa Terrace wells.

Very respectfully,

M. G. LILLEY
AC/S, Facilities

Decision on Recommended Action:

CS Concur ____________ Nonconcur ___________

CG Approved ___________ Disapproved __________

Need more info as we discussed

CALGON CORPORATION
SUBSIDIARY OF MERCK & CO., INC.

ACTIVATED CARBON DIVISION CALGON CORPORATION P.O. BOX 6768 1081 ROUTE 22 BRIDGEWATER, NJ 08807 (201) 526-4646

February 27, 1985

Mr. Jerry Harwood
Code 114
LANT Division Naval Station
Norfolk, VA 23511

Dear Mr. Harwood:

Per our recent telephone conversation, for your planning purposes, you would like to obtain budget cost estimates for emergency potable water treatment systems for the following cases:

Flow:	100 gpm, 300 gpm and 500 gpm
Contaminant:	1600-2000 ppb trichloroethylene

Depending on the treatment objectives and whether the air (after air-stripping) can be discharged to the atmosphere, air-stripping may be the preferred mode of treatment. Calgon can design and provide air-strippers (literature enclosed) and will be pleased to do so, if requested.

However, at this time we will only address the emergency treatment systems (utilizing granular activated carbon) that Calgon can provide.

Calgon can provide two-stage skid mounted Calgon Carbon Service^{SM} Adsorption Modules for treating either 100, 300, or 500 gpm. One of these modules will provide you with sufficient contact time to treat 100 or 300 gpm. Should you need to treat 500 gpm we would recommend installation of two of these modules, with each module treating 250 gpm. The following are budget estimates for one of these modules (double the cost for two modules for the 500 gpm application):

A. Delivery, installation supervision, and start-up of one-train, two stage Calgon Carbon Service Adsorption System including the initial fill of two truckloads (20,000 lbs. per truckload) of virgin Filtrasorb 300 activated carbon; carbon reactivation tests; first month's System usage; dismantling supervision; removal and refurbishing of Calgon's Adsorption System upon completion of the project. . . . . $60-70,000.

B. Fee after the first month (includes continuing equip-usage, major maintenance). . . . . . . $ 5,000/mo.

C. Extra Truckloads of virgin Filtrasorb 300 activated carbon (20,000 lbs. per truckload), including removal of the exhausted carbon for thermal destruction of the organics on it. . . . .$21,000.00.

Based on the organic and its concentration given by you, we do not anticipate any problems in accepting the exhausted carbon from this project. However, the above budget estimates assume acceptance of the exhausted carbon by Calgon. Furthermore, based on the presence of 1600-2000 ppb of trichloroethylene (alone) we estimate the weight pick-up on the carbon to be 6-7%.

Relative to delivery of these Systems, Calgon attempts to maintain an adequate inventory to enable us to ship them within 24-48 hours of receiving the client's authorization. Our inventory situation, can, however, vary depending on customer's needs and the emergency projects in operation at a given point in time.

We believe this letter has included all the information you require. We would, of course, be pleased to prepare Proposals on specific projects, as the needs arise. Should you have any questions on this letter, or if I can be of any further assistance, please do not hesitate to contact me.

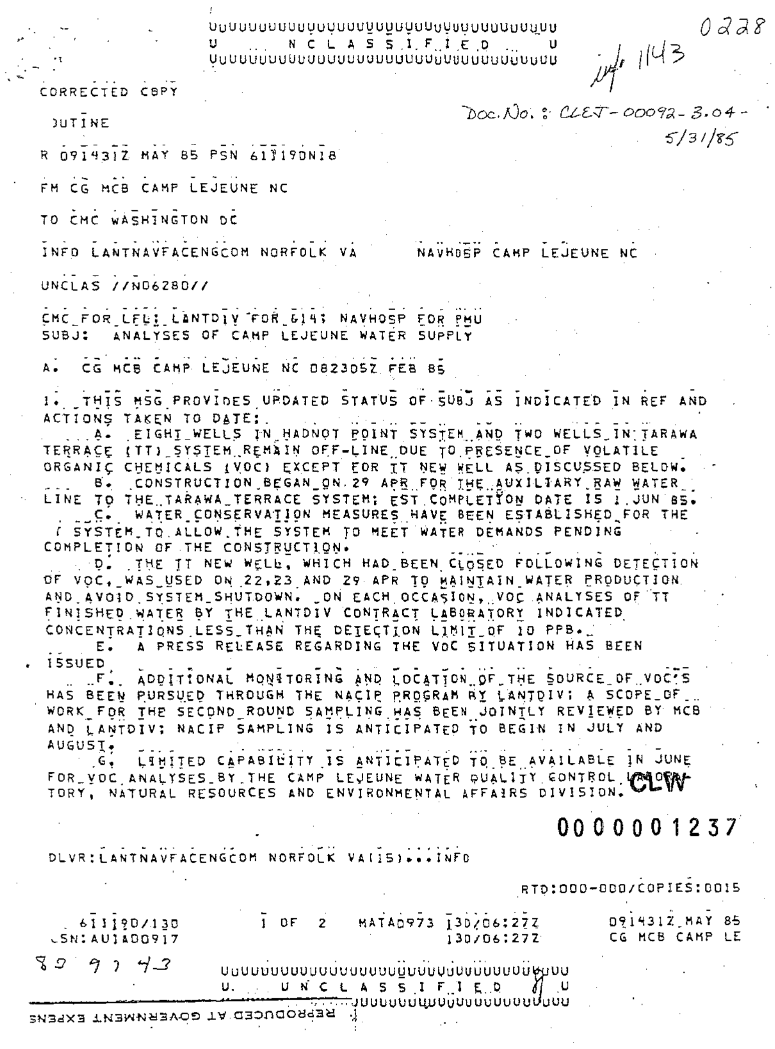
Very truly yours,

CALGON CARBON CORPORATION

Vipin Kuckreja

Vipin Kuckreja
Sr. Technical Sales Representative

VK:lg
Enclosures



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Doc. No.: CLEJ-00092-3.04-
5/31/85

R 091431Z MAY 85 PSN 611190N18

FM CG MCB CAMP LEJEUNE NC

TO CMC WASHINGTON DC

INFO LANTNAVFACENGCOM NORFOLK VA NAVHOSP CAMP LEJEUNE NC

UNCLAS //N06280//

CMC FOR LFL; LANTDIV FOR 614; NAVHOSP FOR PMU
SUBJ: ANALYSES OF CAMP LEJEUNE WATER SUPPLY

A. CG MCB CAMP LEJEUNE NC 082305Z FEB 85

1. THIS MSG PROVIDES UPDATED STATUS OF SUBJ AS INDICATED IN REF AND ACTIONS TAKEN TO DATE:

A. EIGHT WELLS IN HADNOT POINT SYSTEM AND TWO WELLS IN TARAWA TERRACE (TT) SYSTEM REMAIN OFF-LINE DUE TO PRESENCE OF VOLATILE ORGANIC CHEMICALS (VOC) EXCEPT FOR TT NEW WELL AS DISCUSSED BELOW.

B. CONSTRUCTION BEGAN ON 29 APR FOR THE AUXILIARY RAW WATER LINE TO THE TARAWA TERRACE SYSTEM; EST COMPLETION DATE IS 1 JUN 85.

C. WATER CONSERVATION MEASURES HAVE BEEN ESTABLISHED FOR THE (SYSTEM TO ALLOW THE SYSTEM TO MEET WATER DEMANDS PENDING COMPLETION OF THE CONSTRUCTION.

D. THE TT NEW WELL, WHICH HAD BEEN CLOSED FOLLOWING DETECTION OF VOC, WAS USED ON 22,23 AND 29 APR TO MAINTAIN WATER PRODUCTION AND AVOID SYSTEM SHUTDOWN. ON EACH OCCASION, VOC ANALYSES OF TT FINISHED WATER BY THE LANTDIV CONTRACT LABORATORY INDICATED CONCENTRATIONS LESS THAN THE DETECTION LIMIT OF 10 PPB.

E. A PRESS RELEASE REGARDING THE VOC SITUATION HAS BEEN ISSUED

F. ADDITIONAL MONITORING AND LOCATION OF THE SOURCE OF VOC'S HAS BEEN PURSUED THROUGH THE NACIP PROGRAM BY LANTDIV; A SCOPE OF WORK FOR THE SECOND ROUND SAMPLING HAS BEEN JOINTLY REVIEWED BY MCB AND LANTDIV; NACIP SAMPLING IS ANTICIPATED TO BEGIN IN JULY AND AUGUST.

G. LIMITED CAPABILITY IS ANTICIPATED TO BE AVAILABLE IN JUNE FOR VOC ANALYSES BY THE CAMP LEJEUNE WATER QUALITY CONTROL LABORATORY, NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS DIVISION.

CLW

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DLVR:LANTNAVFACENGCOM NORFOLK VA(15)...INFO

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Doc No.: CLEJ-0009
3.04 - 5/31/85

POC IS MR. BOB ALEXANDER, MCB ENVIRONMENTAL ENGINEER, AV 484-34/5925.

BT

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364-87

NATIONAL PRIORITIES LIST

CAMP LEJEUNE, N.C.—As a result of a 1985 discovery of water contamination here, the Environmental Protection Agency is likely to place Camp Lejeune, as well as other Federal installations, on the National Priorities List (NPL).

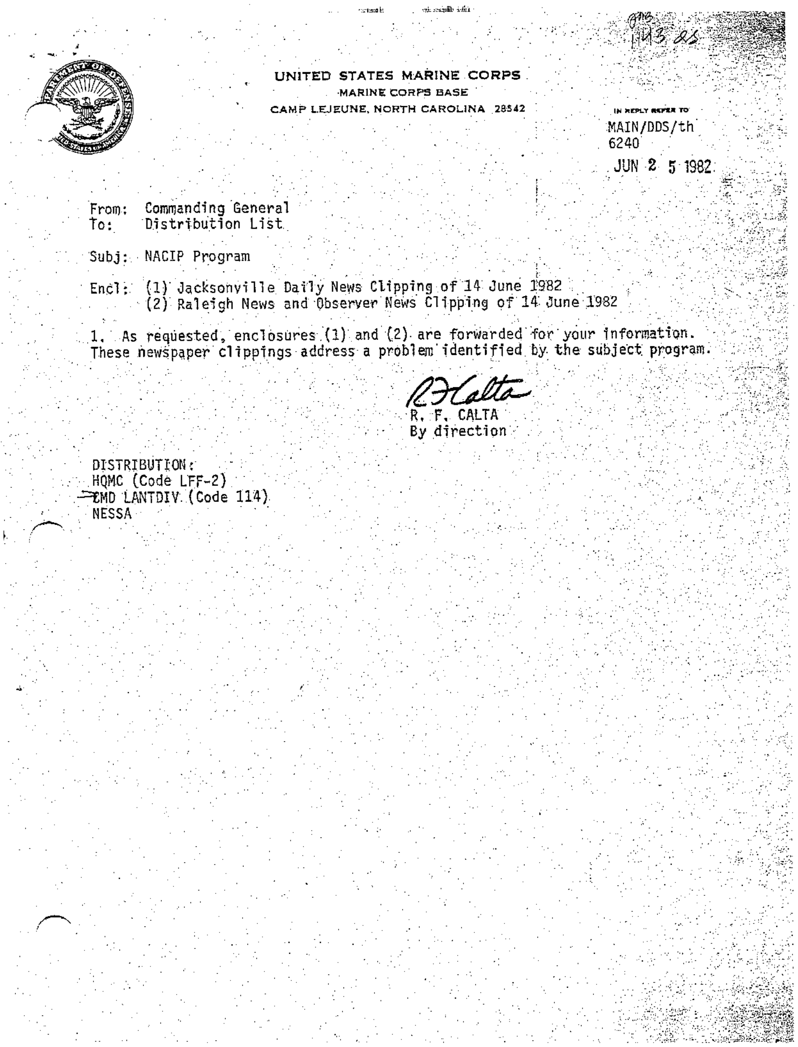
The NPL establishes priorities for the EPA's use of Superfund monies to clean up what they consider to be among the most serious toxic sites in the United States. However, federal facilities are not eligible to receive Superfund monetary assistance unless the contamination is caused by a private concern.

The area under study at Camp Lejeune is the Hadnot Point industrial area. In 1985, traces of trichloroethylene, dichloroethylene and tetrachloroethylene were found in 8 of 35 wells in this area. The affected wells were immediately closed, and have remained closed since. No single contamination point has been identified as the source of contamination for the wells, and no contamination has been detected by periodic tests of drinking water aboard base.

Camp Lejeune continuously pursues a vigorous program of hazardous waste training, handling, and management that includes annual courses of instruction for those dealing with hazardous waste. In addition, the base has minimized the use of hazardous materials by substituting non-hazardous substances for vehicle maintenance and parts cleaning.

No hazardous waste is permanently disposed of aboard Camp Lejeune.

As a Model Installation and as a responsible part of the Eastern North Carolina community, Camp Lejeune is dedicated to protection and preservation of the environment in cooperation with state and national officials.



1143 85

UNITED STATES MARINE CORPS
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542

IN REPLY REFER TO
MAIN/DDS/th
6240
JUN 25 1982

From: Commanding General
To: Distribution List

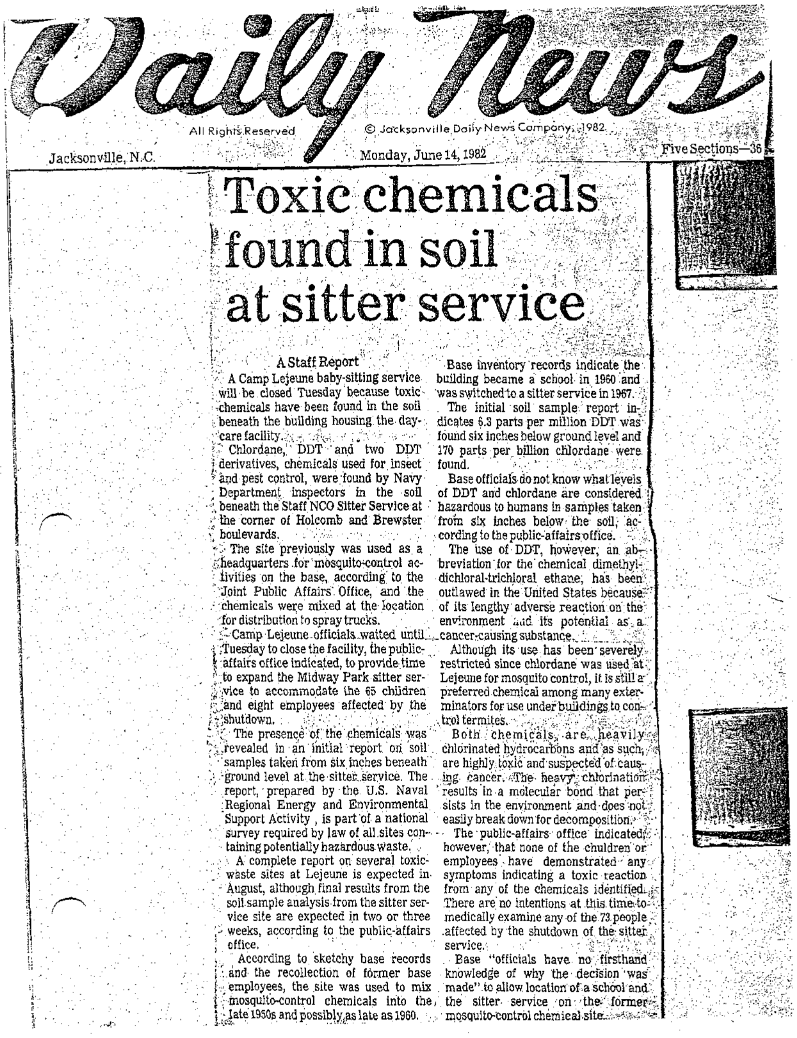
Subj: NACIP Program

Encl: (1) Jacksonville Daily News Clipping of 14 June 1982
(2) Raleigh News and Observer News Clipping of 14 June 1982

1. As requested, enclosures (1) and (2) are forwarded for your information. These newspaper clippings address a problem identified by the subject program.

R F Calta
R. F. CALTA
By direction

DISTRIBUTION:
HQMC (Code LFF-2)
→CMD LANTDIV (Code 114)
NESSA



Daily News
Jacksonville, N.C.
Monday, June 14, 1982
Five Sections—36

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Toxic chemicals found in soil at sitter service

A Staff Report

A Camp Lejeune baby-sitting service will be closed Tuesday because toxic chemicals have been found in the soil beneath the building housing the day-care facility.

Chlordane, DDT and two DDT derivatives, chemicals used for insect and pest control, were found by Navy Department inspectors in the soil beneath the Staff NCO Sitter Service at the corner of Holcomb and Brewster boulevards.

The site previously was used as a headquarters for mosquito-control activities on the base, according to the Joint Public Affairs Office, and the chemicals were mixed at the location for distribution to spray trucks.

Camp Lejeune officials waited until Tuesday to close the facility, the public-affairs office indicated, to provide time to expand the Midway Park sitter service to accommodate the 65 children and eight employees affected by the shutdown.

The presence of the chemicals was revealed in an initial report on soil samples taken from six inches beneath ground level at the sitter service. The report, prepared by the U.S. Naval Regional Energy and Environmental Support Activity , is part of a national survey required by law of all sites containing potentially hazardous waste.

A complete report on several toxic-waste sites at Lejeune is expected in August, although final results from the soil sample analysis from the sitter service site are expected in two or three weeks, according to the public-affairs office.

According to sketchy base records and the recollection of former base employees, the site was used to mix mosquito-control chemicals into the late 1950s and possibly as late as 1960.

Base inventory records indicate the building became a school in 1960 and was switched to a sitter service in 1967.

The initial soil sample report indicates 6.3 parts per million DDT was found six inches below ground level and 170 parts per billion chlordane were found.

Base officials do not know what levels of DDT and chlordane are considered hazardous to humans in samples taken from six inches below the soil, according to the public-affairs office.

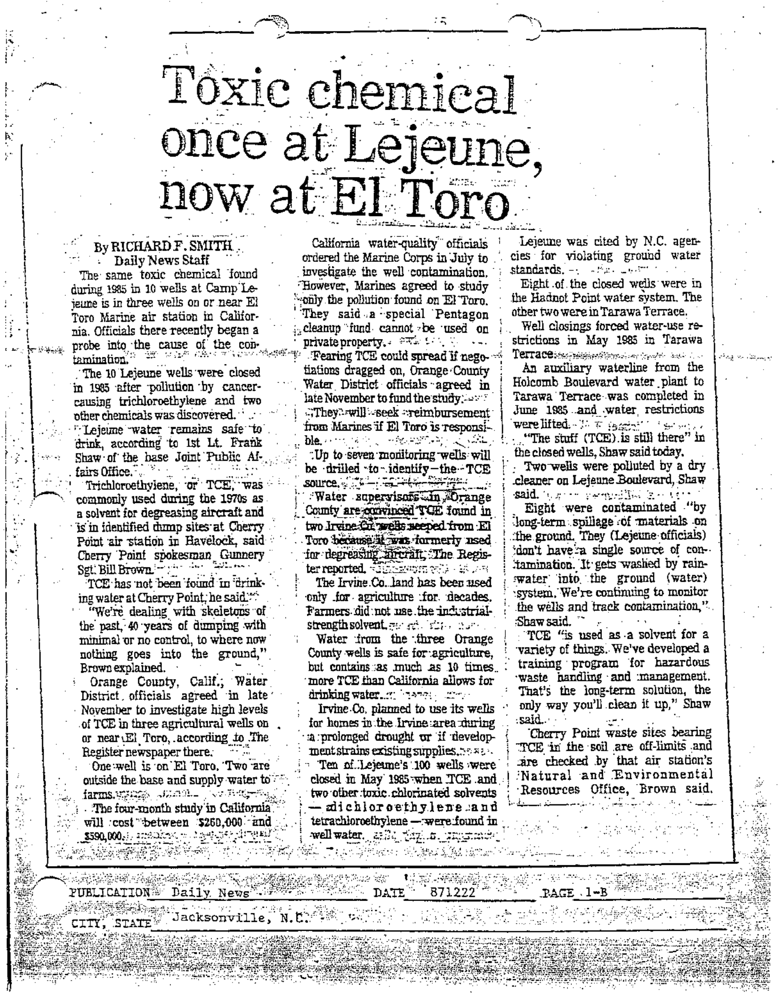
The use of DDT, however, an abbreviation for the chemical dimethyl-dichloral-trichloral ethane, has been outlawed in the United States because of its lengthy adverse reaction on the environment and its potential as a cancer-causing substance.

Although its use has been severely restricted since chlordane was used at Lejeune for mosquito control, it is still a preferred chemical among many exterminators for use under buildings to control termites.

Both chemicals are heavily chlorinated hydrocarbons and as such, are highly toxic and suspected of causing cancer. The heavy chlorination results in a molecular bond that persists in the environment and does not easily break down for decomposition.

The public-affairs office indicated, however, that none of the chuldren or employees have demonstrated any symptoms indicating a toxic reaction from any of the chemicals identified. There are no intentions at this time to medically examine any of the 73 people affected by the shutdown of the sitter service.

Base "officials have no firsthand knowledge of why the decision was made" to allow location of a school and the sitter service on the former mosquito-control chemical site.



Toxic chemical once at Lejeune, now at El Toro

By RICHARD F. SMITH
Daily News Staff

The same toxic chemical found during 1985 in 10 wells at Camp Lejeune is in three wells on or near El Toro Marine air station in California. Officials there recently began a probe into the cause of the contamination.

The 10 Lejeune wells were closed in 1985 after pollution by cancer-causing trichloroethylene and two other chemicals was discovered.

Lejeune water remains safe to drink, according to 1st Lt. Frank Shaw of the base Joint Public Affairs Office.

Trichloroethylene, or TCE, was commonly used during the 1970s as a solvent for degreasing aircraft and is in identified dump sites at Cherry Point air station in Havelock, said Cherry Point spokesman Gunnery Sgt. Bill Brown.

TCE has not been found in drinking water at Cherry Point, he said.

"We're dealing with skeletons of the past, 40 years of dumping with minimal or no control, to where now nothing goes into the ground," Brown explained.

Orange County, Calif., Water District officials agreed in late November to investigate high levels of TCE in three agricultural wells on or near El Toro, according to The Register newspaper there.

One well is on El Toro. Two are outside the base and supply water to farms.

The four-month study in California will cost between $260,000 and $590,000.

California water-quality officials ordered the Marine Corps in July to investigate the well contamination. However, Marines agreed to study only the pollution found on El Toro. They said a special Pentagon cleanup fund cannot be used on private property.

Fearing TCE could spread if negotiations dragged on, Orange County Water District officials agreed in late November to fund the study.

They will seek reimbursement from Marines if El Toro is responsible.

Up to seven monitoring wells will be drilled to identify the TCE source.

Water supervisors in Orange County are convinced TCE found in two Irvine Co. wells seeped from El Toro because it was formerly used for degreasing aircraft, The Register reported.

The Irvine Co. land has been used only for agriculture for decades. Farmers did not use the industrial-strength solvent.

Water from the three Orange County wells is safe for agriculture, but contains as much as 10 times more TCE than California allows for drinking water.

Irvine Co. planned to use its wells for homes in the Irvine area during a prolonged drought or if development strains existing supplies.

Ten of Lejeune's 100 wells were closed in May 1985 when TCE and two other toxic chlorinated solvents — dichloroethylene and tetrachloroethylene — were found in well water.

Lejeune was cited by N.C. agencies for violating ground water standards.

Eight of the closed wells were in the Hadnot Point water system. The other two were in Tarawa Terrace.

Well closings forced water-use restrictions in May 1985 in Tarawa Terrace.

An auxiliary waterline from the Holcomb Boulevard water plant to Tarawa Terrace was completed in June 1985 and water restrictions were lifted.

"The stuff (TCE) is still there" in the closed wells, Shaw said today.

Two wells were polluted by a dry cleaner on Lejeune Boulevard, Shaw said.

Eight were contaminated "by long-term spillage of materials on the ground. They (Lejeune officials) don't have a single source of contamination. It gets washed by rainwater into the ground (water) system. We're continuing to monitor the wells and track contamination," Shaw said.

TCE "is used as a solvent for a variety of things. We've developed a training program for hazardous waste handling and management. That's the long-term solution, the only way you'll clean it up," Shaw said.

Cherry Point waste sites bearing TCE in the soil are off-limits and are checked by that air station's Natural and Environmental Resources Office, Brown said.

PUBLICATION Daily News DATE 871222 PAGE 1-B

CITY, STATE Jacksonville, N.C.

09.11-06/07/84-0

Environmental study kicks-off

A team of experts contracted by the Navy is conducting an extensive environmental study at Camp Lejeune and MCAS, New River. The study, which began in May, will assess pollution control operations and soil and ground water quality at 21 sites throughout Camp Lejeune and New River.

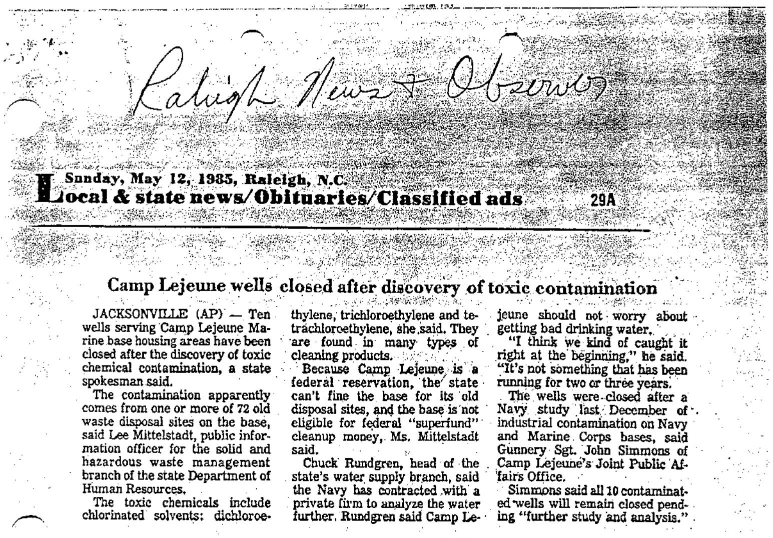
Environmental engineers and scientists from the consulting firm of Environmental Science and Engineering, Inc. of Gainesville, Fla., will spend approximately six weeks drilling wells and collecting water, soil and sediment samples to determine if hazardous materials exist and/or have the potential to contaminate the environment upon the base.

Colonel M. G. Lilley, assistant chief of staff, facilities, stated, "While contractor personnel will rountinely wear personal protective equipment such as chemical resistant coveralls, we do not expect to expose anyone to any contaminants."

The results of the survey are due in August 1984. If any contaminants are discovered, a review of alternatives will determine action necessary to meet health and environmental standards.

Everything advertised in this publication must be made available for purchase, use or patronage without regard to race, creed, color, national origin, or sex of the publisher, user, or patron. A confirmed violation or rejection of the policy by an advertiser will result in the refusal to print advertising from that source.

"Globe" 7 June 1984



Raleigh News & Observer

Sunday, May 12, 1985, Raleigh, N.C.
Local & state news/Obituaries/Classified ads 29A

Camp Lejeune wells closed after discovery of toxic contamination

JACKSONVILLE (AP) — Ten wells serving Camp Lejeune Marine base housing areas have been closed after the discovery of toxic chemical contamination, a state spokesman said.

The contamination apparently comes from one or more of 72 old waste disposal sites on the base, said Lee Mittelstadt, public information officer for the solid and hazardous waste management branch of the state Department of Human Resources.

The toxic chemicals include chlorinated solvents: dichloroethylene, trichloroethylene and tetrachloroethylene, she said. They are found in many types of cleaning products.

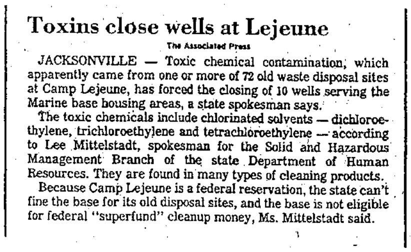
Because Camp Lejeune is a federal reservation, the state can't fine the base for its old disposal sites, and the base is not eligible for federal "superfund" cleanup money, Ms. Mittelstadt said.

Chuck Rundgren, head of the state's water supply branch, said the Navy has contracted with a private firm to analyze the water further. Rundgren said Camp Lejeune should not worry about getting bad drinking water.

"I think we kind of caught it right at the beginning," he said. "It's not something that has been running for two or three years."

The wells were closed after a Navy study last December of industrial contamination on Navy and Marine Corps bases, said Gunnery Sgt. John Simmons of Camp Lejeune's Joint Public Affairs Office.

Simmons said all 10 contaminated wells will remain closed pending "further study and analysis."



Toxins close wells at Lejeune

The Associated Press

JACKSONVILLE — Toxic chemical contamination, which apparently came from one or more of 72 old waste disposal sites at Camp Lejeune, has forced the closing of 10 wells serving the Marine base housing areas, a state spokesman says.

The toxic chemicals include chlorinated solvents — dichloroethylene, trichloroethylene and tetrachloroethylene — according to Lee Mittelstadt, spokesman for the Solid and Hazardous Management Branch of the state Department of Human Resources. They are found in many types of cleaning products.

Because Camp Lejeune is a federal reservation, the state can't fine the base for its old disposal sites, and the base is not eligible for federal "superfund" cleanup money, Ms. Mittelstadt said.

Chemicals discovered in Lejeune water wells

By RICHARD F. SMITH
Daily News Staff

A Navy study of industrial contamination has found volatile chemicals in 10 deep-water wells at Camp Lejeune, causing Tarawa Terrace residents to face restrictions on water use while a new line is built.

Substances found in the wells were described today as "volatile organic chemicals" by Gunnery Sgt. John Simmons of Lejeune's Joint Public Affairs Office.

He said he had no information on whether the well water is dangerous to humans.

"According to the memo from the chief of staff, facilities, no federal or state regulations mandate an unacceptable level of these organic chemicals in drinking water," Simmons said.

"The wells were ordered closed pending further study and analysis under the Navy Assessment and Control of Installation Pollutants Program," the spokesman said.

"Ten deep-water wells aboard base have been taken off-line since December as a result of a Navy-wide study of industrial contamination aboard Navy and Marine Corps installations," Simmons said.

"Eight of the closed wells are in the Hadnot Point water-supply system, which services the mainside area of the base. The other two wells are in Tarawa Terrace," he said.

"The well closures have not created any water-supply problems for Hadnot Point, but the Tarawa Terrace system can barely meet current demand for finished water.

"As a result, the commanding general (Maj. Gen. Louis H. Buehl III) has imposed some water restrictions on Tarawa Terrace residents," Simmons said.

"A recent bulletin sent to Tarawa Terrace housing residents urged them to conserve water in the following ways: water lawns Monday through Thursday from 6 a.m. to 9 a.m. only, do not wash cars, do not let the water run while brushing your teeth or washing dishes and only flush toilets for sanitary

JACKSONVILLE DAILY NEWS,
MAY 10, 1985, FRONT PAGE

Base closes ten wells; wastes found

By Donna Long
and Shannon Brennan

10 wells serving two base housing areas have been closed.

Ten wells serving Camp Lejeune housing areas have been closed due to chemical contamination.

The contamination apparently comes from one or more of 72 old waste disposal sites at Camp Lejeune, said Lee Mittelstadt, public information officer for the Solid and Hazardous Waste Management Branch of the N.C. Department of Human Resources.

The chemicals include chlorinated solvents — dichloroethylene, trichloroethylene and tetrachloroethylene — and are toxic, she said. They are found in many types of cleaning products.

Because Camp Lejeune is a federal reservation, the state cannot fine the base for its old disposal sites and the base is not eligible for federal Superfund cleanup money, she said.

Chuck Rundgren, head of the state's Water Supply Branch, said the Navy has contracted with a private firm to analyze the water further. Rundgren said he did not think Camp Lejeune residents need to worry about getting bad drinking water.

"I think we kind of caught it right at the beginning," he said.

Eight of the closed wells served the Hadnot Point housing area and two served Tarawa Terrace. The closures leave Hadnot Point with an adequate water supply, but Tarawa Terrace residents have been ordered to conserve.

"That system can just barely meet the current water demand," Gunnery Sgt. John Simmons of Lejeune's Joint Public Affairs office said of Tarawa Terrace.

Lawns in the housing project may be watered only between 6 and 9 a.m. Monday through Thursday and washing cars is prohibited.

Residents are urged not to let water run while they wash dishes or brush their teeth and to flush toilets only for sanitary purposes.

Simmons said an auxiliary water line to ease the water shortage in Tarawa Terrace should be completed in early June.

The wells were closed after a Navy study in December of industrial contamination on Navy and Marine Corps bases, Simmons said.

Simmons said all 10 of the contaminated wells will remain closed pending "further study and analysis under the Navy Assessment and Control of Installation Pollutants Program."

Simmons said he could not say how the contamination got in the wells. He did not know how deep the wells were.

Simmons said that while there were no state or federal regulations that mandate an unacceptable level of such contaminants in drinking water, "we ordered the closure of all wells that showed even a trace amount."

Donna Long is a Star-News correspondent; Shannon Brennan is a staff writer.

WILMINGTON MORNING STAR,
MAY 11, 1985, PAGE 1B

Camp Lejeune water testing underway

[illegible] DEC '84

Globe Staff Report

Environmental officials here are taking precautionary measures to ensure drinking water is free from possible contamination.

AS A RESULT of water samples taken Dec. 3, four wells in the Hadnot Point industrial area were found to contain some traces of organic compounds. According to Base Environmental Engineer, Bob Alexander, four of 35 wells serving the Hadnot Point water treatment plant were shut down and additional test samples ordered.

None of the organic compounds noted in the test samples are listed in the regulations under the Safe Drinking Water Act. Testing is being conducted as part of a basewide confirmation study which is currently underway to verify whether any groundwater contamination exists and to identify abatement measures.

The closing of the four wells has not affected the ability of the Hadnot Point water treatment plant to produce potable water. Alexander added that daily water samples are being taken from the water treatment plant to ensure drinking water remains within prescribed federal and state guidelines established by the Safe Drinking Water Act.

A DETAILED SAMPLING effort of the entire Hadnot Point water system will be completed in the coming months to pinpoint any wells which might contain organic compounds. If necessary, an abatement plan will be prepared for approval by the North Carolina Division of Health Services.

The Hadnot Point water treatment plant has the capacity to produce five million gallons of potable water per day. It serves the Hadnot Point industrial area, French Creek and Hospital Point. Alexander emphasized that every effort will be made to maintain the excellent quality water supply traditionally provided to residents of Camp Lejeune.

Gerald Dixon, a North Carolina Alcohol Law Enforcement Division agent, recently returned the wallet Private First Class Tony Danlely, 8th Communications, 2d Force Service Support Group lost two weeks ago in Wilmington. The wallet was returned with $140 still in it.

Anniversary celebrated

As one of two major operational commands in the Marine Corps, Fleet Marine Force, Atlantic, commanded by Lieutenant General Al Gray, has been responsible for the amphibious combat element of the U. S. Navy's Atlantic Fleet since 1946.

THE HEADQUARTERS STAFF, composed of approximately 500 officers and enlisted men, controls the deployable Marine units located at Camp Lejeune, New River, Cherry Point, N.C. and Beaufort, S.C.

As a "Force in Readiness," FMFLant has continually deployed units under its control since 1948, reaching such faraway lands as Norway, Germany and nations of the Mideast with a regularity that guarantees worldwide recognition of the uniforms of U. S. Marines.

Lieutenant General Gray and his staff at Norfolk, Va., celebrate the 38th anniversary of the command on Dec. 16 with best wishes to all "'Lant Marines and sailors" and confident hopes for a coming 39th year as an amphibious "Force in Readiness."

Construction creates need for alternate route

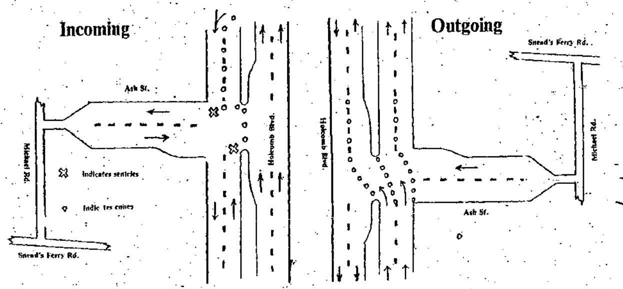
Story by Sgt. Dennis V. Carter

Traffic on Snead's Ferry Road is scheduled to be rerouted Dec. 15-19. The rerouting will effect both incoming and outgoing traffic.

THE REROUTING IS necessary due to railroad construction of rails that cross Snead's Ferry Road. Because of the construction, part of Snead's Ferry Road will be closed.

Traffic that normally was routed down Snead's Ferry Road will be rerouted down Ash Street for incoming traffic.

Outgoing traffic will be basically the same, except that traffic heading toward Swansboro will need to stay in the right lane.



0911-12/01/84-00523

GLOBE
Shopco Publishing Company

The Globe is published every Thursday in cooperation with the Joint Public Affairs Office, Camp Lejeune, N.C.

Everything advertised in this publication

Doc. No.: CLEJ-00523-9.11-10/16/86

The Offic[illegible]
bus leaves from the O'Club at [illegible], leaves Myrtle Beach at 4:30 p.m. and arrives home at 7 p.m. All members are invited. Send $8,50 reservation check for OWC, P.O. Box 8531, Camp Lejeune, NC 28540. Reservation deadline is Oct. 24.

10/16/86

NEWSBRIEFS

Memorial of-limits

The Beirut Memorial site at the entrance of Camp Johnson is off limits until the Oct. 23 dedication ceremony. Although construction is nearly completed, visits to the sight or casual walk-throughs prior to Oct. 23 are a hindrance to workers and are strictly prohibited.

Retired Military Day

Marine Corps Base will host the annual Retired Military Day at Marston Pavilion on Oct. 25. The event is open to retired persons and their families from all branches of the Armed Services and is intended to provide information on a wide variety of subjects.

A fried chicken lunch will be served at a cost of $5 per person. Call 451-2524/2525 for reservations.

In conjunction with Retired Military Day, a golf tournament is also planned for Oct. 25 for all interested retired golfers. Cost is $10 per person and covers green fees, cart fees and prizes. Tee-off times are 7:30 a.m. and 1:30 p.m. Call John Fletcher at 451-5445 to sign up for the tournament or more information.

Field House closed

The gymnasium floor of Goettge Memorial Field Hou[illegible] will be closed Oct. 31 to Nov. 23. However, the mini-exercise room, locker rooms, showers and sauna facilities will remain available for use except from 3 p.m. on Nov. 7 to 10 a.m., Nov. 12.

The gym floor will open for use on Nov. 24.

Bacteria detected

Marine Corps Base, Camp Lejeune, operates eight separate water systems to supply the water needs of the entire Camp Lejeune/New River complex.

During routine testing of the systems serving Courthouse Bay and the Rifle Range, two water samples in each system showed a coliform bacteria concentration above the allowable limits for the systems. Subsequent water samples within these systems indicated that no coliform bacterial were present. Since subsequent testing indicated that no coliform bacteria was present, there is no cause for concern.

Coliform bacteria is not generally considered to be a disease producing organism. Its presence merely suggests that conditions may be appropriate for the growth of other disease carrying organisms.

The base monitors all water systems aboard the base to ensure compliance with water quality standards and reporting requirements of the Safe Drinking Water Act. The search continues to find the cause of the abnormal readings.

If you have any questions, call the Head, Occupational Preventive Medic[illegible] Department, 451-5707.

Birthday ceremony

Camp Lejeune's Joint Daytime Ceremony, celebrating the Marine Corps' 211th Birthday, will be held Nov. 10 at 9:30 a.m. at Liversedge Field.

The ceremony will include a historical uniform pageant, rededication of the National and Marine Corps colors and the traditional cutting of the Marine Corps birthday cake. According to tradition, the first pieces of cake will be presented to the oldest and youngest Marines at Camp Lejeune.

The ceremony is open to military personnel and civilians. The uniform for military spectators is as follows:

Marines in formation—winter service "A".

Other Marines—dress blue "B" or winter service "A".

Navy personnel—service dress blue.

Further information on the seating arrangement for the ceremony will appear in the Oct. 30 issue of the *Globe*.

3d MarDiv opens chapter

The 3d Marine Division Association plans to open a Chapter in the state of North Carolina. All former members of the Division including retired and U.S. Navy, should contact Jimmie A. Bryant, P.O. Box 1224, Lenoir, NC 28645, or call (704) 758-2023 for more information.

DOC NO: CLEJ -00523- 9,11-1

The News and Observer, Raleigh, N.C., Tues., April 17, 1984

Commission reviews state's water classificatio

By MONTE BASGALL
Staff Writer

Nagging questions about chemical pollution have prompted state officials to take a hard look at North Carolina's 30-year-old system for qualifying water bodies as sources of raw drinking water.

"We have a communications problem," Robert F. Helms said last week at a work session of the N.C. Environmental Management Commission, which is charged with establishing such standards. "If the commission doesn't clear this up, we're going to have problems dealing with the public."

Helms directs the N.C. Division of Environmental Management, which is charged with advising the commission and enforcing its rules.

He was referring to the alphabetized water quality classification system for lakes, rivers and major streams.

Most freshwater bodies are classified A-II, B or C, depending upon whether they are to be maintained for drinking water supplies, swimming activities, or fishing and boating.

An additional classification, A-I, covers a few additional waterways that the state considers "pristine."

Except for A-I, the requirements of the alphabetical standards aren't that different, although the B (swimming) classification calls for lower summer bacteria counts than the other two, while the A-II (drinking water) classification has the most restrictions on toxic chemicals and other problem substances.

Before a segment is recommended for the drinking water classification, the state repeatedly tests water in the affected area to make sure that bacterial and existing chemical standards are being met.

It also evaluates what is being released into the water by dischargers immediately upstream.

Not considered are the hundreds of chemicals for which the state has developed no standards. In addition, the state's evaluation does not extend to far-upstream pollution sources — including the risk that land uses could result in chemical spills or agriculture pesticide runoff.

According to a division briefing paper that Helms' staff distributed to the commission, critics feel upstream pollution is not adequately accounted for when the state reclassifies water to the A-II (drinking water) standard.

Critics also say that classifying all but the most pristine raw drinking water as A-II "implies to the public that these supplies are of similar quality despite varying types and amounts of point (sewage discharges) and non-point sources of pollution," the paper added.

The issue first came to a head in October, when the commission voted to reclassify most of Lake Jordan to the A-II drinking water standard, but only on a "qualified" basis.

The qualified classification — which requires additional studies before any of Jordan's water could be allocated for drinking — was imposed because of questions about industrial chemical pollutants that are released into upstream sections of the Haw River, which feeds the lake.

The public also is confused about the present alphabet ratings, officials said. They noted that while the A category logically would be considered better than B, the bacteria standard for the state's B (swimming) water quality classification is more stringent than A-II.

Helms' staff suggested a "narrative," "descriptive," non-alphabetized alternative. One idea would create several "water supply" classifications covering an entire watershed.

"Natural watersheds" would be preserved in a pristine state, while "rural watersheds" would allow septic tanks and agricultural activities but no sewage treatment plant discharges.

"Developing watersheds" would permit domestic sewage treatment plant discharges, but no industrial development. "Industrial watersheds" would require special attention to the threat of toxic pollutants, with more stringent classifications in [illegible] sections than others.

The commission decided last week to study the question.

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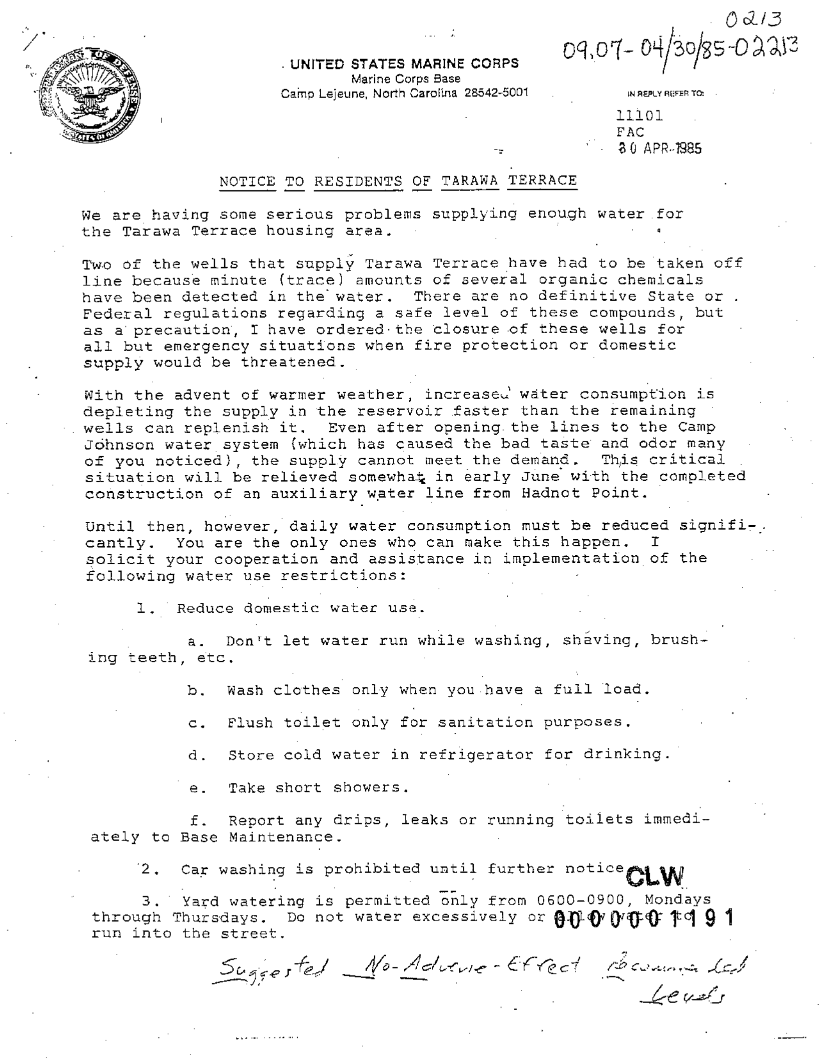

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UNITED STATES MARINE CORPS
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

IN REPLY REFER TO:
11101
FAC
30 APR 1985

NOTICE TO RESIDENTS OF TARAWA TERRACE

We are having some serious problems supplying enough water for the Tarawa Terrace housing area.

Two of the wells that supply Tarawa Terrace have had to be taken off line because minute (trace) amounts of several organic chemicals have been detected in the water. There are no definitive State or Federal regulations regarding a safe level of these compounds, but as a precaution, I have ordered the closure of these wells for all but emergency situations when fire protection or domestic supply would be threatened.

With the advent of warmer weather, increased water consumption is depleting the supply in the reservoir faster than the remaining wells can replenish it. Even after opening the lines to the Camp Johnson water system (which has caused the bad taste and odor many of you noticed), the supply cannot meet the demand. This critical situation will be relieved somewhat in early June with the completed construction of an auxiliary water line from Hadnot Point.

Until then, however, daily water consumption must be reduced significantly. You are the only ones who can make this happen. I solicit your cooperation and assistance in implementation of the following water use restrictions:

1. Reduce domestic water use.

   a. Don't let water run while washing, shaving, brushing teeth, etc.

   b. Wash clothes only when you have a full load.

   c. Flush toilet only for sanitation purposes.

   d. Store cold water in refrigerator for drinking.

   e. Take short showers.

   f. Report any drips, leaks or running toilets immediately to Base Maintenance.

2. Car washing is prohibited until further notice.

3. Yard watering is permitted only from 0600-0900, Mondays through Thursdays. Do not water excessively or allow water to run into the street.

Suggested No-Adverse-Effect Recommended Levels

Subj: NOTICE TO RESIDENTS OF TARAWA TERRACE

Thank you for your understanding in this matter. If these measures are effective in reducing overall water usage, we should be able to open the Tarawa Terrace swimming pool as scheduled. We will keep you informed.

L. H. BUEHL
Major General, U.S. Marine Corps
Commanding General

No high concentrations of pollutants found

By RICHARD F. SMITH
Daily News Staff

Tests of suspected hazardous-waste pollution sites at Camp Lejeune have detected heavy metals, organic chemicals and pesticides, but concentrations are not high enough to endanger humans, according to base officials.

"The first round of contamination study monitoring has detected compounds, including organic chemicals, pesticides and heavy metals in some cases," said Sgt. Pam Vajner of Lejeune's Joint Public Affairs Office.

Technicians are checking water and soil samples for more than 50 possible pollutants.

"While compounds listed as toxic by (U.S.) Environmental Protection Agency standards have been found in detectable levels, no concentrations have been found which present human health hazards," the sergeant said.

Information on Lejeune's anti-pollution effort was released through the office of Assistant Chief of Staff, Facilities, Marine Corps Base.

Environmental Science and Engineering Co. of Gainesville, Fla., will begin monitoring 22 suspected pollution sites on base in early 1986 "upon completion of Navy contract negotiations with ESE," Ms. Vajner said.

Base officials have said that only trace amounts of contamination have been found at the sites.

"Continued sample collection of soil, ground water and surface waters will be completed by ESE."

That review is expected to take about 15 months.

When the entire $500,000 study is finished, "Camp Lejeune and Headquarters, Marine Corps, will review the studies, recommend remedial measures and request Department of Defense funding for the best options," the sergeant said.

For the past 40 years, hazardous chemicals — including mercury and the pesticides chlordane, Diazinon and DDT — have been spilled, dumped and burned at locations across the 170-square-mile base.

No one has been identified as being harmed by the pollutants.

However, long-term environmental risks have not been fully assessed, an omission the study is intended to correct.

The project is necessary for the base to comply with the federal Superfund Act, which stipulates military officials must identify all hazardous-waste disposal sites on bases and report them to the EPA.

In a 1983 survey, the Navy examined 73 waste-disposal sites at Lejeune and three outlying sites in Jones County.

The 22 sites were targeted for more investigation because of known or suspected contamination from fuel, discarded explosives and chemicals including cancer-causing solvents, toxic polychlorinated biphenyls or PCBs in transformer oil and pesticides.

Base officials have said the 22 sites are not considered dangerous because only trace amounts of contamination have been found to have escaped from the dumps and said people have not been directly exposed to those pollutants.

Ten of Lejeune's 100 wells were closed in May when toxic substances were found in the well water.

The organic chemicals included chlorinated solvents which are found in many types of cleaning products.

Lejeune authorities were cited in May for violating ground water standards by state officials who tested the well water.

No additional contaminants were found in water samples taken in late May from the 10 wells, base officials said.

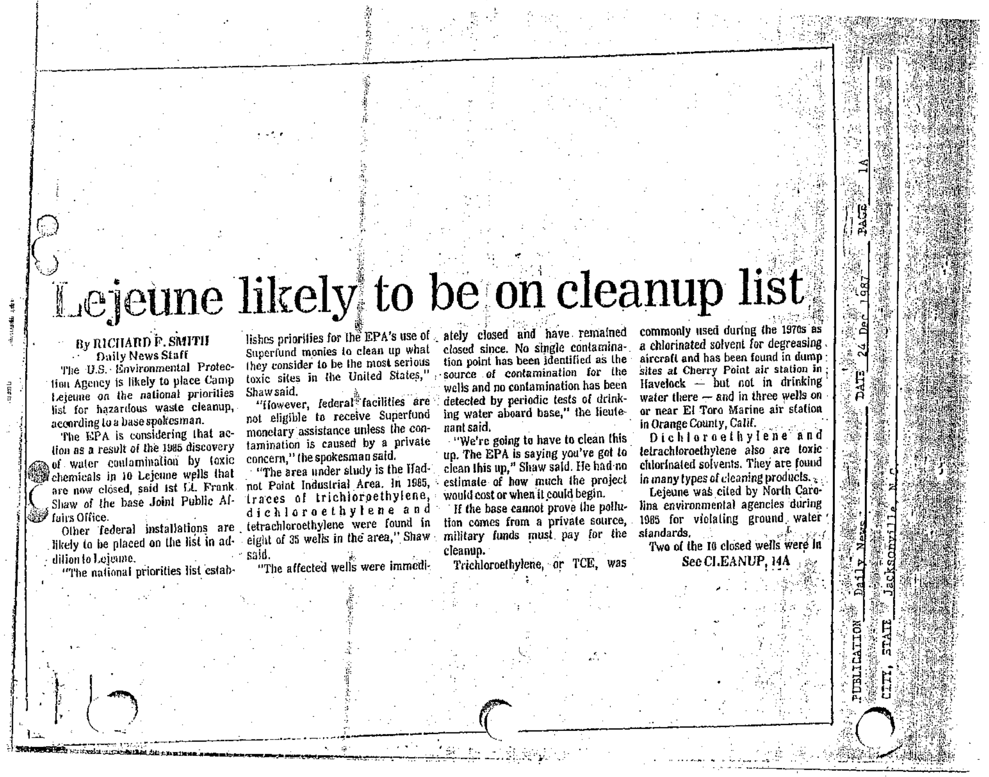
Closing of the wells forced some water-use restrictions during early May in Tarawa Terrace.

An auxiliary waterline from the Holcomb Boulevard water plant to Tarawa Terrace was completed in early June and w restrictions were lifted.

In a related matter, about 4,000 gallons of fuel leaked in September from an underground storage tank at the Tarawa Terrace gas station.

Plans for recovery of the gasoline are complete and removal of the fuel should start within days, Ms. Vajner said.

JAX Daily News 1 Jan 86



PUBLICATION Daily News DATE 24 Dec 1987 PAGE 1A
CITY, STATE Jacksonville, N.C.

Lejeune likely to be on cleanup list

By RICHARD F. SMITH
Daily News Staff

The U.S. Environmental Protection Agency is likely to place Camp Lejeune on the national priorities list for hazardous waste cleanup, according to a base spokesman.

The EPA is considering that action as a result of the 1985 discovery of water contamination by toxic chemicals in 10 Lejeune wells that are now closed, said 1st Lt. Frank Shaw of the base Joint Public Affairs Office.

Other federal installations are likely to be placed on the list in addition to Lejeune.

"The national priorities list establishes priorities for the EPA's use of Superfund monies to clean up what they consider to be the most serious toxic sites in the United States," Shaw said.

"However, federal facilities are not eligible to receive Superfund monetary assistance unless the contamination is caused by a private concern," the spokesman said.

"The area under study is the Hadnot Point Industrial Area. In 1985, traces of trichloroethylene, dichloroethylene and tetrachloroethylene were found in eight of 35 wells in the area," Shaw said.

"The affected wells were immediately closed and have remained closed since. No single contamination point has been identified as the source of contamination for the wells and no contamination has been detected by periodic tests of drinking water aboard base," the lieutenant said.

"We're going to have to clean this up. The EPA is saying you've got to clean this up," Shaw said. He had no estimate of how much the project would cost or when it could begin.

If the base cannot prove the pollution comes from a private source, military funds must pay for the cleanup.

Trichloroethylene, or TCE, was commonly used during the 1970s as a chlorinated solvent for degreasing aircraft and has been found in dump sites at Cherry Point air station in Havelock — but not in drinking water there — and in three wells on or near El Toro Marine air station in Orange County, Calif.

Dichloroethylene and tetrachloroethylene also are toxic chlorinated solvents. They are found in many types of cleaning products.

Lejeune was cited by North Carolina environmental agencies during 1985 for violating ground water standards.

Two of the 10 closed wells were in

See CLEANUP, 14A

Hazardous wastes and their effects explained

The overall coordinator for Camp Lejeune's placement on the National Priorities List will be Col. Thomas J. Dalzell, Assistant Chief of Staff, Facilities, Marine Corps Base. He recently answered some questions concerning NPL and the effects it might have on Camp Lejeune residents and workers.

Colonel Thomas J. Dalzell

Q. What is the National Priorities List?

A. Congress passed the Resource Conservation and Recovery Act back in the late 1970s, and that Resource Conservation and Recovery Act is our nation's hazardous waste management program. As part of that program, Congress requested that all the various activities within DoD and the federal government take a look at past hazardous waste dump sites and practices and initiate a plan to clean up these hazardous waste sites--especially where they impact on ground water contamination.

Q. Are there any hazardous waste sites aboard Camp Lejeune?

A. Yes there are. As a result of the Resource Conservation and Recovery Act the Navy developed what was called the NACIP program, and it was a program to go out and look at all Navy and Marine Corps installations and find out where past hazardous waste dump sites or any types of dumps were located. A study was done back in 1983 at Camp Lejeune, and from research of records, talking to people, and going out to look through the area, 77 old dump sites were identified here at Camp Lejeune. Of those 77 sites, 22 of them that were marked for further study, we have a number of sites right now, mainly in the Hadnot Point area where we have some test wells to monitor the amount of contamination and whether or not it's migrating through the ground.

Q. Is my health or the health of my family is any danger?

A. No it's not. All the wells which we get our raw water out of are continually tested and the wells that were identified as being contaminated have been closed off. All the other wells with water coming out contain no health problems at all to any individual who is living or working aboard Camp Lejeune or anyone in the local community.

Q. What about prior to 1983?

A. At that time we were not aware of any of these particular compounds that might have been in the ground water and we have no information that anyone's health was in any danger at that time.

Q. Could the contamination escape Camp Lejeune into Jacksonville?

A. Right now all the information we have is the contamination within the strata underground is contained, and we have no evidence of it migrating out into the local community. It's contained within Camp Lejeune.

Q. How do you test the drinking water?

A. Our drinking water is tested in accordance with the Safe Water Drinking Act. We do a bacteriological test on all of our water once a week, we do a heavy metal test once every three years, we do a volatile organic compound test once every three months, trihalomethane test once every three months and a radiological test every four years. All these tests are in accordance with federal and state regulations and meet those requirements.

Q. What are the chemicals found used for?

A. Most of the chemicals found mainly come from solvents, degreasers and other types of materials that we use in the maintenance and repair of vehicles aboard the base.

Q. What are the long term effects of exposure to these contaminants?

A. Heavy long term exposure to these chemicals could cause some health hazards, depending on the amount of chemicals ingested.

Q. What precautions should we take?

A. The only precaution anybody here at Camp Lejeune needs to take is to ensure they only drink water that is coming through our approved water sources. Don't drink water out of streams; don't drink raw water from a well site that somebody may have drilled around the area. These are the only precautions that individuals need to be aware of. At any time

CLEJ GLOBE 2/25/88

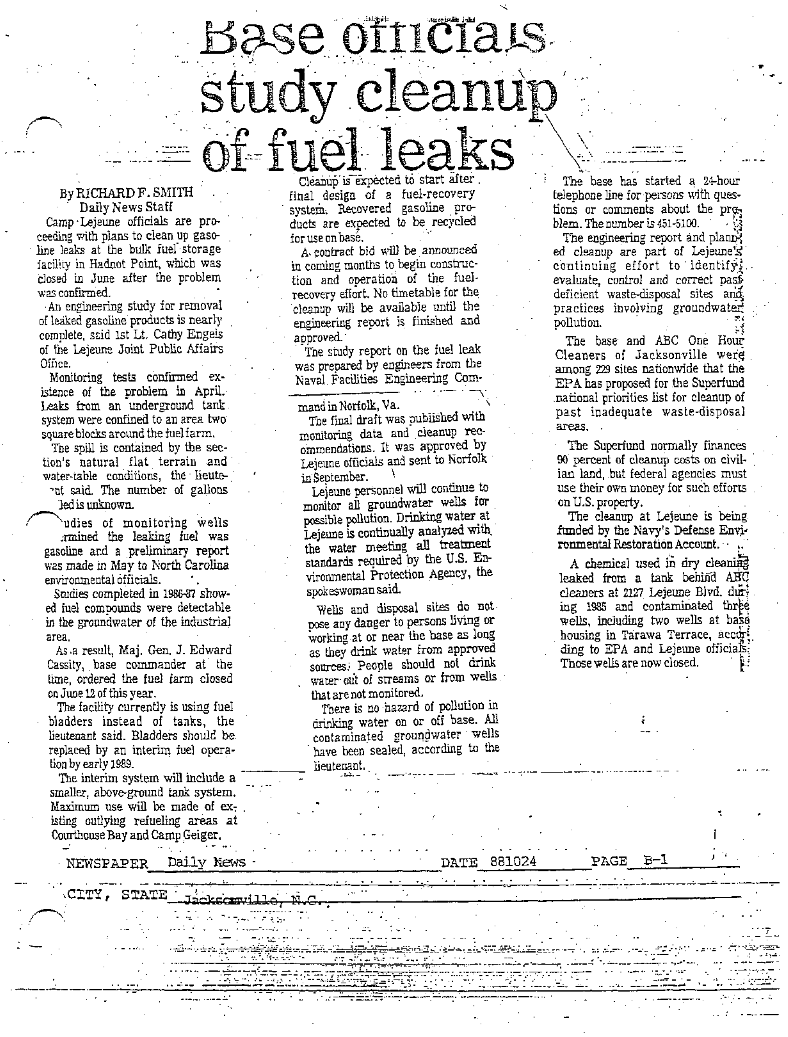
SECTION 1 - INTRODUCTION

1.01 Site Description

Marine Corps Base (MCB) Camp Lejeune is located in Onslow County, North Carolina (Figure 1). The facility has a roughly triangular outline and covers approximately 170 square miles. Eleven miles of Atlantic shoreline form the eastern boundary of Camp Lejeune. The western and northeastern boundaries are U.S. Rt. 17 and State Rt. 24, respectively. The town of Jacksonville, North Carolina is the northern boundary of the base (ESE, 1985).

Construction of MCB Camp Lejeune began in 1941, at the Hadnot Point area, where major functions were centered. As the facility grew and developed, Hadnot Point became crowded with maintenance and industrial activities (Water and Air Research, 1983). The general Hadnot Point area is illustrated on Figure 2.

The Hadnot Point Fuel Farm (HPFF), the specific area of this hydrogeologic investigation, is located approximately 1200 feet to the southeast of Holcombe Boulevard, adjacent to Ash Street as depicted on Figure 1. The HPFF was constructed in about 1941 and consists of 15 fuel storage tanks. There is one (1) above ground 600,000 gallon tank (Tank 10), six underground (6) 12,000 gallon tanks (Tanks 2, 3, 7, 8 11, 12), and eight underground (8) 15,000 gallon tanks (Tanks 1, 4, 5, 6, 9, 13, 14, and 15). All tanks except the 600,000 gallon tank were originally placed at grade and completely covered with soil. The existing tanks are the original tanks that were installed in about 1941. The large 600,000 gallon tank contains diesel fuel, the other tanks contain leaded gasoline, unleaded gasoline and kerosene.



Base officials study cleanup of fuel leaks

By RICHARD F. SMITH
Daily News Staff

Camp Lejeune officials are proceeding with plans to clean up gasoline leaks at the bulk fuel storage facility in Hadnot Point, which was closed in June after the problem was confirmed.

An engineering study for removal of leaked gasoline products is nearly complete, said 1st Lt. Cathy Engels of the Lejeune Joint Public Affairs Office.

Monitoring tests confirmed existence of the problem in April. Leaks from an underground tank system were confined to an area two square blocks around the fuel farm.

The spill is contained by the section's natural flat terrain and water-table conditions, the lieute- nt said. The number of gallons led is unknown.

udies of monitoring wells rmined the leaking fuel was gasoline and a preliminary report was made in May to North Carolina environmental officials.

Studies completed in 1986-87 showed fuel compounds were detectable in the groundwater of the industrial area.

As a result, Maj. Gen. J. Edward Cassity, base commander at the time, ordered the fuel farm closed on June 12 of this year.

The facility currently is using fuel bladders instead of tanks, the lieutenant said. Bladders should be replaced by an interim fuel operation by early 1989.

The interim system will include a smaller, above-ground tank system. Maximum use will be made of existing outlying refueling areas at Courthouse Bay and Camp Geiger.

Cleanup is expected to start after final design of a fuel-recovery system. Recovered gasoline products are expected to be recycled for use on base.

A contract bid will be announced in coming months to begin construction and operation of the fuel-recovery effort. No timetable for the cleanup will be available until the engineering report is finished and approved.

The study report on the fuel leak was prepared by engineers from the Naval Facilities Engineering Command in Norfolk, Va.

The final draft was published with monitoring data and cleanup recommendations. It was approved by Lejeune officials and sent to Norfolk in September.

Lejeune personnel will continue to monitor all groundwater wells for possible pollution. Drinking water at Lejeune is continually analyzed with the water meeting all treatment standards required by the U.S. Environmental Protection Agency, the spokeswoman said.

Wells and disposal sites do not pose any danger to persons living or working at or near the base as long as they drink water from approved sources. People should not drink water out of streams or from wells that are not monitored.

There is no hazard of pollution in drinking water on or off base. All contaminated groundwater wells have been sealed, according to the lieutenant.

The base has started a 24-hour telephone line for persons with questions or comments about the problem. The number is 451-5100.

The engineering report and planned cleanup are part of Lejeune's continuing effort to identify, evaluate, control and correct past deficient waste-disposal sites and practices involving groundwater pollution.

The base and ABC One Hour Cleaners of Jacksonville were among 229 sites nationwide that the EPA has proposed for the Superfund national priorities list for cleanup of past inadequate waste-disposal areas.

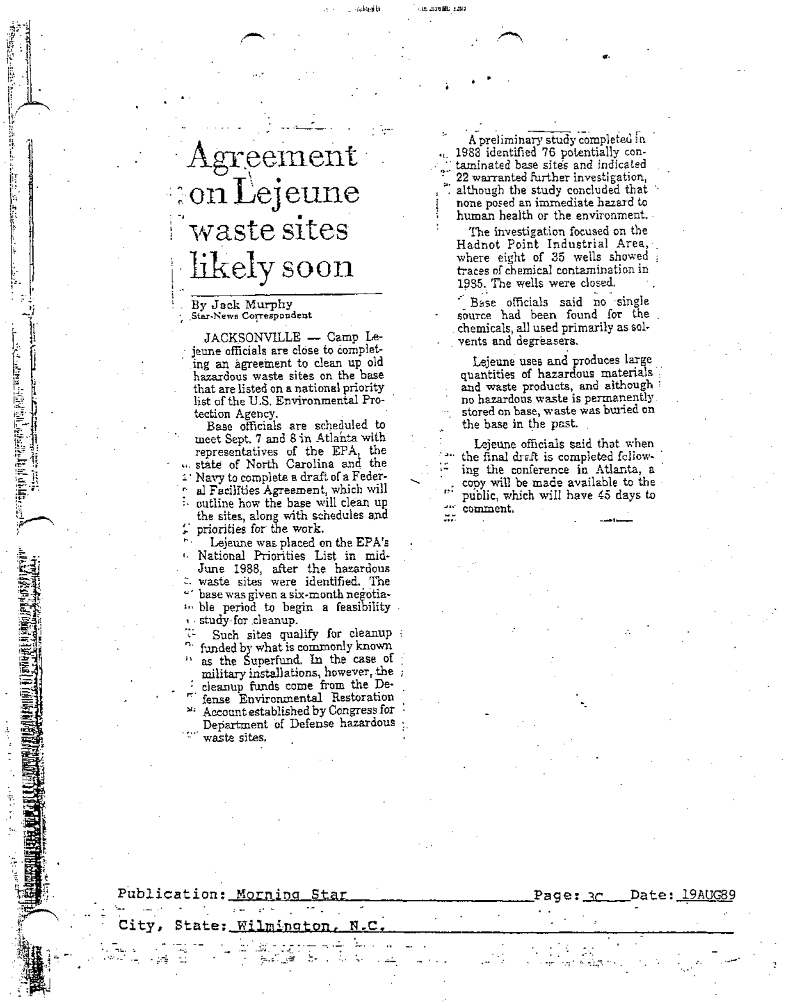
The Superfund normally finances 90 percent of cleanup costs on civilian land, but federal agencies must use their own money for such efforts on U.S. property.

The cleanup at Lejeune is being funded by the Navy's Defense Environmental Restoration Account.

A chemical used in dry cleaning leaked from a tank behind ABC cleaners at 2127 Lejeune Blvd. during 1985 and contaminated three wells, including two wells at base housing in Tarawa Terrace, according to EPA and Lejeune officials. Those wells are now closed.

NEWSPAPER Daily News DATE 881024 PAGE B-1

CITY, STATE Jacksonville, N.C.



Agreement on Lejeune waste sites likely soon

By Jack Murphy
Star-News Correspondent

JACKSONVILLE — Camp Lejeune officials are close to completing an agreement to clean up old hazardous waste sites on the base that are listed on a national priority list of the U.S. Environmental Protection Agency.

Base officials are scheduled to meet Sept. 7 and 8 in Atlanta with representatives of the EPA, the state of North Carolina and the Navy to complete a draft of a Federal Facilities Agreement, which will outline how the base will clean up the sites, along with schedules and priorities for the work.

Lejeune was placed on the EPA's National Priorities List in mid-June 1988, after the hazardous waste sites were identified. The base was given a six-month negotiable period to begin a feasibility study for cleanup.

Such sites qualify for cleanup funded by what is commonly known as the Superfund. In the case of military installations, however, the cleanup funds come from the Defense Environmental Restoration Account established by Congress for Department of Defense hazardous waste sites.

A preliminary study completed in 1983 identified 76 potentially contaminated base sites and indicated 22 warranted further investigation, although the study concluded that none posed an immediate hazard to human health or the environment.

The investigation focused on the Hadnot Point Industrial Area, where eight of 35 wells showed traces of chemical contamination in 1985. The wells were closed.

Base officials said no single source had been found for the chemicals, all used primarily as solvents and degreasers.

Lejeune uses and produces large quantities of hazardous materials and waste products, and although no hazardous waste is permanently stored on base, waste was buried on the base in the past.

Lejeune officials said that when the final draft is completed following the conference in Atlanta, a copy will be made available to the public, which will have 45 days to comment.

Publication: Morning Star Page: 3C Date: 19AUG89
City, State: Wilmington, N.C.

Lejeune waste sites placed on federal list

Hadnot fuel farm spill is first to be cleaned up

BY RICHARD F. SMITH
DAILY NEWS STAFF

Camp Lejeune has been placed on the federal National Priorities List for identification and cleanup of hazardous-waste sites.

The list is used by the U.S. Environmental Protection Agency to deal with old waste sites on federal land under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, usually called the Superfund.

Installations are ranked on the list by the Harzard Ranking System, which assigns values relating to the risk of movement of contaminants through ground water, surface water and air, according to the Lejeune Joint Public Affairs Office.

Studies at Lejeune during 1982 revealed 76 separate sites for past hazardous waste management operations.

Of those, 26 sites warranted more study because they represented a potential threat to health and the environment.

A follow-up probe of these sites in 1984 resulted in the closure of eight drinking wells in the Hadnot Point Industrial Area because of verified contamination from fuel compounds.

Two wells were closed in base housing in Tarawa Terrace because of pollution from an off-base dry cleaner. Other sites are still in the preliminary stages of investigation.

Base spokesmen say there is no immediate health threat from the sites, but base officials instituted safety measures during 1988 to detect any movement of pollutants from the most severely affected sections.

For more information on the program or Lejeune's listing on the NPL, call the NPL hotline at 451-5100.

The Hadnot Point fuel farm will be the first area on base to be cleaned up under a new agreement with federal officials.

PUBLICATION Daily News DATE 23 Oct 89 PAGE 1 B
CITY, STATE Jacksonville, NC

0351

injuries and goes into action. Only the basics at this point. Stop the bleeding, calm him down and get him to the battalion aid station.

the bleeding, calm him him to the battalion aid

wounded Marine is in and resting on a hospital back home.

lifesaving process that through to get to that Co., 2nd Medical Bn. on the methods of get-

station to be put aboard a field ambulance. The ambulance then heads for the Collecting and Clearing Co. or field hospital.

When wounded Marines arrive at the field hospital, they are admitted into the shock/surgical triage. The worst casualties are prepared for surgery, while the others have their dressings replaced and their paperwork started.

Everyone at the field hospital has a specific job to do and it must be performed with great skill. Lives depend on it. There can't be hesitation or indecision.

THREE DAYS OF GRIME — A Marine from STA Plt, BLT28, 26th MEU (SOC), peers through NVGs after a three-day patrol at Fort A.P. Hill, Va., earlier this year. The 26th MEU (SOC) currently serving its six-month Mediterranean deployment, which began in June, will participate in Exercise Display Determination '89 in September. Display Determination '89 is a large-scale combined NATO exercise and is the highlight of the 26th MEU (SOC) deployment.

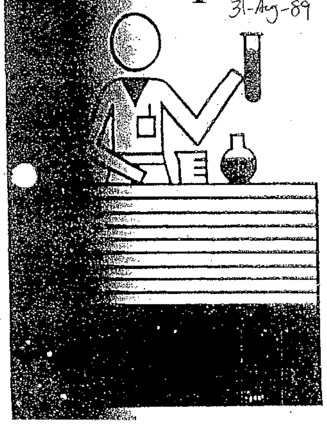
The Collecting and Clearing Co. is usually located 10 to 15 miles behind the front line. It consists of two operating rooms, two intensive care units, a laboratory and a tent for X-rays. It also has a 60-bed ward, including the ICU.

"This is the first place the wounded can receive blood and surgery. The surgery conducted at this level is often referred to by corpsmen as "life and limb surgery," said HMC G.C. Centenera, acting XO, Alpha Co. "The most important goal being the survival of the patient. Even if it means the loss of a limb."

See Corpsman, Page 15A

se taps into drinking water concerns

31-Aug-89



DoD program plans to identify, assess, clean up possible contamination

EDITOR'S NOTE: This is the first in a three-part series about the drinking water in the Camp Lejeune/MCAS New River system. The articles examine past problems that have raised concerns with the water supply.

By Cpl. Dave Mundy

During the past decade, the subject of hazardous waste has become a major environmental issue across the country. Real health dangers have been found at sites where, in years past, the "trash" was routinely dumped, buried or poured out on the ground.

The emergence of these health hazards has added a new burden to government officials at the community, state and national level: to find the sites, clean them up, and keep the contaminants from harming the population and environment.

The hazard most often comes from the contaminants filtering through the soil in which they are dumped and entering the underground water system. In most places in America, wells tapping into that system are what supply the public's drinking water.

The Safe Drinking Water Act of 1983 requires regular testing of water systems for contaminants. Recent tests on Camp Lejeune's six water systems indicated the quality of drinking water at all six sites was well within state and federal standards. In fact, no detection levels were exceeded in the testing for 36 potential contaminants.

But contaminated sites found at Camp Lejeune in 1982-84 remain a source of concern for base officials.

Preliminary testing at 76 sites aboard Camp Lejeune and MCAS New River in 1982-83 pinpointed 22 as warranting further investigation because they represented a potential threat to health and the environment. These included fuel farms, maintenance areas, open-burning pits and storage areas.

Sampling at those 22 sites was conducted in 1984.

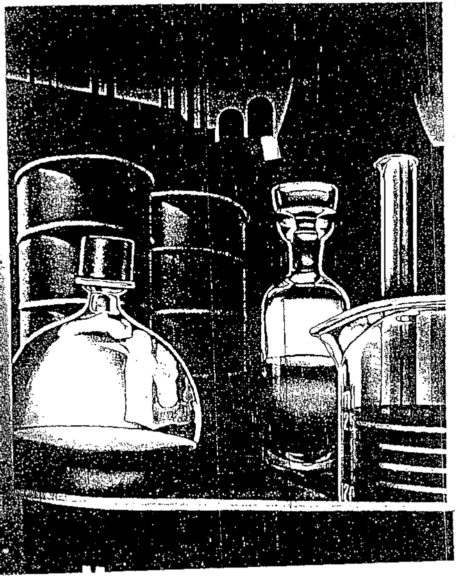
See Water, Page 11A

Water—

Continued from Page 1A

No contamination was found at three of the sites; two sites yielded no contamination by fuel, but lead compounds were present. Two more sites were identified as having traces of the chemical DDT. At 15 sites, contamination was verified.

"Even then, none of the contamination found was above the limit described as acceptable by the EPA," said B. W. Elston, deputy assistant chief-of-staff, facilities, MCB. "We closed eight wells in the Hadnot Piont Industrial Area and two in the Tarawa Terrace area as a precautionary measure and still had an adequate water supply."



"We shut down some wells that were not near the EPA limit," said Elizabeth Betz, base chemical engineer. "Then we started looking at what caused that contamination."

The testing and remedial action to clean up the sites was done as part of the Installation Restoration Program (IRP), the Department of Defense's program to identify, assess and clean up old hazardous waste sites.

The IRP consists of three phases. Phase I is a preliminary assessment and on-site inspection to identify possible contamination. Phase II is designed to determine how bad contamination is and what caused it. Phase III consists of developing the right technology and conducting the actual clean-up of hazardous sites.

The eight wells in the Hadnot Point Industrial Area were found in the 1984 sampling to be contaminated by volatile organic compounds (VOCs), mainly benzene and trichloroethylene.

"These are petroleum-based chemicals that evaporate rapidly in open air, and most come from man-made solvents," Betz said. "You'd have to look at each VOC individually, but many of them are carcinogens. That's the main reason we immediately shut the wells down, although the levels we found in the tests were not near the EPA limit."

The contamination was caused by long-term spillage and dumping in the Industrial Area.

"Past practices were not regulated and most of the chemicals we found we solvents used to clean vehicles ar machinery," Betz said.

The two wells in Tarawa Terrace we shut down as a result of contaminatio by tetrachloral ethylene, a compoun commonly used in the dry-cleanin business.

"We were puzzled when that chemic showed up. At first, we couldn't figur out how it had gotten into the Taraw Terrace system," Betz said. "Then w looked across Highway 24. There was dry-cleaning business right across th road from the housing area."

The contaminant had come from th dry cleaners originally suspected. Base of ficials immediately took action to pum safe drinking water to the housing area

"We laid a temporary water line t Tarawa Terrace immediately upon clos ing the wells there," Elston said. "Sinc then, we have added a permanent lin from our Holcomb Boulevard wate treatment plant to Tarawa Terrace. Tha line also serves Camp Johnson."

With the identification of contaminated sites and immediate action t protect the drinking water supply, base officials then turned to the task of measuring contamination, studying alternatives and forming plans for cleaning up the hazards.

"Once you have identified where the potential for a threat is, you start taking action to correct it," Betz said. 'You cannot leave a contaminant in the groundwater."

NEXT: Phase plans and actions

Simply the finest...

Civilians, military investigating waste dumps at Camp Lejeune

By JERRY ALLEGOOD
Staff Writer

CAMP LEJEUNE — Since the 1960s, Building 712 had housed a nursery and day-care center for the children of Camp Lejeune's Marines. But the young children were moved away in 1982 when the soil of their fenced-in playground was found to be poisoned by a number of pesticides.

The building on Holcomb Boulevard hadn't always been a nursery. Over a 13-year span before toddlers were moved in, the Marine Corps had stored, mixed and spilled thousands of gallons of pesticides in and around Building 712. Among them, according to a 1983 Navy survey, were heavy volumes of chlordane, diazinon and DDT.

Some of the environmental impacts of military training at Camp Lejeune can be seen instantly, when artillery rounds slam into a target range and blast craters out of the sandy, shrub-covered soil.

But other effects are less apparent. Over the past 40 years, hazardous chemicals have been spilled, dumped, buried and burned at sites scattered across the 170-square-mile base in coastal Onslow County.

Gallons of mercury — enough to poison 184,000 acres of foot-deep water if it ever reached the shallow water table — were drained from radar equipment and buried. Tear gas and other poisons may have been buried beneath what later was a basketball court, the Navy survey found.

No one has been harmed by the wastes, officials said. But no one has yet fully assessed the long-term environmental risks, either. This year, however, the dump sites are receiving new attention from civilian and military environmental officials.

Since February, 10 of Camp Lejeune's 100 wells have been closed after they were found to be polluted. Eight had been tainted by small amounts of fuel and solvents used to clean weapons and vehicles. Solvents found in two of the wells, in a residential neighborhood at the northern edge of the base, have been tentatively linked to civilian dry-cleaning firms in nearby Jacksonville.

State environmental officials who tested the wells cited Camp Lejeune in May for violating groundwater standards. Partly in response to the state's findings, the Marines this summer commissioned a 15-month, $500,000 study of 22 known or suspected hazardous waste sites scattered around the base.

Environmental officials say they do not consider the waste dumps threats either to New River and nearby streams and estuaries or to the 35,500 military personnel and 11,500 dependents who live or work on the base. But the Marine Corps wants to measure pollution at the sites and assess the long-term risks. A Gainesville, Fla., firm conducting the new study will make recommendations about which dumps should be cleaned up.

"The last thing we want to find is that there is a large piece of Camp Lejeune that can't be used because of toxic waste disposal," Robert B. Alexander, a base environmental engineer, said in an interview last week. "This study will in some cases open up areas where there is enough question now to limit certain types of activity."

Alexander said the 22 sites are not considered dangerous because only trace amounts of contamination have been found to have escaped from the dumps. He said people had not been directly exposed to the pollutants. (The Navy report on Building 712, however, showed that the playground used by the children was among the contaminated areas.) Activities are restricted near contaminated sites, Alexander said, some of which are in remote locations.

In the 1983 survey, the Navy examined 73 waste disposal sites on the base and three outlying sites in Jones County. The 22 sites were flagged for further investigation because of known or suspected contamination from fuel, discarded explosives and chemicals including cancer-causing solvents, PCBs in transformer oil and pesticides.

Most of the known waste sites were located at New River Marine Corps Air Station and in the industrial area near Hadnot Point, where the Marines operate a steam heating plant, paint shops, fuel storage facilities and a sewage treatment plant. Other waste sites may never be found, the Navy report said.

According to the study, the Marines used many scattered sites all over the base for waste disposal. Pesticides were buried in pits. Battery acid was poured in holes in the ground. Waste oil, hydraulic fluids and solvents from aircraft and vehicles were routinely spread on dirt roads for dust control.

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State, federal and military environmental officials said in separate interviews that the practices occurred before the mid-1970s, when environmental laws and controls on the handling of chemical waste were implemented. Solid and hazardous wastes on base are now regulated by the N.C. Department of Human Resources. Under a permit issued in September 1984, the Marine Corps is permitted temporarily to store waste from Camp Lejeune operations until it is shipped to South Carolina for permanent disposal.

Alexander said the Marine Corps in recent years has added millions of dollars worth of pollution abatement facilities, and waste material is now recycled or disposed of properly. He added that Marines receive regular training on proper waste disposal.

"The causes of these problems really aren't there any more," he said.

Wayne Mathis, an environmental engineer with the U.S. Environmental Protection Agency in Atlanta, Ga., said Camp Lejeune's past practices and its problems were neither unique nor alarming. He compared the base to a medium-sized city that would generate waste from residents, vehicle maintenance and industries.

"They would have a little of a lot of things rather than a lot of any one thing," he said.

Arthur E. Linton, federal facilities coordinator for the EPA's southeast region in Atlanta, said Camp Lejeune and other military installations had disposed of waste in ways that were accepted practices in the past.

"The military hasn't done anything that wasn't done in the private sector," he said.

He said the contamination at Camp Lejeune is not as bad as cases at other military bases in other states involving larger amounts of chemicals and incidents where pesticides have contaminated drinking water. The EPA has proposed that four military installations — one in Tennessee, two in Alabama and one in Georgia — receive top priority for a cleanup effort by the Pentagon.

Linton said the most serious problem at Camp Lejeune was contamination of groundwater with solvents that are suspected of causing cancer. The solvents are commonly used for a number of purposes, including cleaning metal and engine parts.

State records indicate that water samples taken from the 10 Camp Lejeune wells that were closed since February contained varying amounts of nine chemicals.

The Marines first found contaminants in the wells last year and informed the state, saidspokesmen for the Marine Corps and the state. State testing confirmed the contamination, and the 10 wells all had been closed when, in May, the N.C. Department of Natural Resources and Community Development informed Marine officials that they had violated groundwater standards. The state said the Marines would have to take corrective measures.

In reply two months later, the Marines said they already had decided to commission the new 15-month study to assess hazardous wastes on the base and also to pinpoint the sources of the well pollutants.

Charles E. Rundgren, head of the state's water supply branch, said the wells had been plugged shortly after they became contaminated. The amount of chemicals found were not a threat to people who had been drinking the water during that short period, he said. The water would not cause someone to become ill from drinking it, he said, but ill effects could result from long-term exposure.

H. Lee Mittelstadt, spokeswoman for the state Solid and Hazardous Waste Branch, said state officials felt Camp Lejeune was taking "adequate steps to protect (people) from possible exposure to the contaminants" by closing down the wells.

She added that contamination from the 22 sites was a potential problem but not an immediate threat because the locations were known and monitoring could detect future trouble.

Camp Lejeune authorities in May notified base residents and water customers of the contaminants with leaflets and articles in the base newspaper. Officials said that after the 10 wells were closed, the base water system was able to provide water from other sources not affected by contaminants.

An NRCD report said contaminants were found in eight wells in the Hadnot Point system and two wells at Tarawa Terrace, a residential area. Some hazardous waste sites pinpointed in the 1983 study are located near the industrial area but none are located at Tarawa Terrace.

Alexander said there is no clear relationship between the closing of the wells and any specific waste site.

"The way we got onto the well problem was in sampling near one of our fuel farms," or fuel storage facilities, he said. "We sampled nearby wells. In one near the fuel farm, we didn't detect fuel but did detect organic solvents."

In its response to the NRCD notice of violation, the Marine Corps said 50 to 70 shallow would be drilled to test groundwater, and the soil near suspected disposal sites would be tested for the presence of chemicals.

Col. R.A. Tiebout, Camp Lejeune's assistant chief of staff for facilities, characterized all of the actions so far — closing wells, relocating the day-care center and extensive testing — as precautionary measures.

"We're going to do everything to make water, air and land as pure as possible," he said.

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PAGE NO: 29A(cont.)
DATE: 15SEPT.85

Pollutants were dumped at many sites

By JERRY ALLEGOOD
Staff Writer

CAMP LEJEUNE — When amphibious vehicles needed their oil changed, they were backed into the woods near Courthouse Bay where, over three decades, they dumped as much as 400,000 gallons of waste motor oil into the soil.

The Marines at Camp Lejeune perform the task differently now, changing and collecting the oil in maintenance areas. But a 1983 Navy survey showed that for years, hazardous chemicals were scattered at a variety of sites around the base.

The survey recommended 22 waste sites for further environmental study. At 10 of the sites, the report said, contamination was caused by petroleum, oil and lubricants. Some of the contamination resulted from spills at fuel storage tanks. In other cases, chemicals had seeped into the ground from pits used to train firefighting crews.

In the past, the report said, about 1,000 gallons a week of contaminated fuel, crankcase fluids, paint thinners and other compounds were spread on roads for dust control, and some fuel and solvents were used for firefighting training.

At the Courthouse Bay site, about 10,000 to 20,000 gallons of used battery acid were poured out at an estimated rate of 60 gallons a month for at least 27 years. The fluid contained sulfuric acid, lead and possibly antimony.

Alexander

Other sites and possible pollutants described in the study include:

- A 100-by-200-foot corridor near Building 804 on Longstaff Road at the New River Air Station, where mercury was drained from radar units and dumped or buried in randomly selected spots. About one gallon per year or 1,000 pounds in all were dumped from 1956 to 1966. The study said that amount of mercury could poison thousands of gallons of water if it reached the water table. But no mercury water contamination has been detected.
- A former chemical dump near the rifle range area, at Camp Lejeune's remote southwest corner, which was used from 1950 to 1976. The six-acre dump could contain 93,000 cubic yards of wastes, including the pesticides DDT, malathion, diazinon, lindane and PCBs sealed in concrete tanks. PCBs, or polychlorinated biphenyls, are cancer-causing agents once used as fire-retarding agents in electrical transformers.
- Two separate sites near Curtis Road at the New River Air Station, one of which had a basketball court on the property. The materials were believed to include drums containing tear gas and solvents that may include chloroform, carbon tetrachloride and benzene. Drums with 4,100 to 5,500 gallons of chemicals were believed to have been buried at the basketball court site, and 1,400 to 4,100 gallons at the other site.
- An area between Sneads Ferry Road and Ash Street that contained a lot used for pesticide mixing and a pit that received transformer oil, which probably contained PCBs. It was estimated the site contained 100 to 1,000 gallons of pesticides and 1,300 to 11,800 gallons of oil. The study noted that quantity estimates were not based on reliable data.
- A former nursery and day-care center in Building 712 that was used from 1945 to 1958 for pesticide storage and mixing. Chemicals used in significant amounts included chlordane, DDT and diazinon. Stored or used to a minor extent were dieldrin, lindane, malathion, silvex and 2,4,5-T. Contaminated areas include a 6,300-foot playground.

Robert B. Alexander, an environmental engineer at Camp Lejeune, said there were no health tests done on children at the center because tests of the building and the site indicated the occupants were not exposed to harmful amounts. He said the children were not located in the same outdoor areas where contamination was suggested but the center was relocated as a precaution.

Wayne Mathis, an environmental engineer with the Environmental Protection Agency, said he could not speculate on the potential risks at each site without knowing specifics about the surrounding area. He said the risk from a particular site would depend on whether the material was in a stable location and whether people had access to the chemicals.

"To have a hazard, you've got to have someone exposed to it or have it moving," he said.

For example, he said, the report of discarded mercury was serious "in that it represents an unknown," but he could not gauge the risk to humans unless it was directly threatening people. In general, he said, pesticides such as DDT do not migrate in the soil so contamination would be localized.

"You wouldn't want kids out there digging in the soil," he said.

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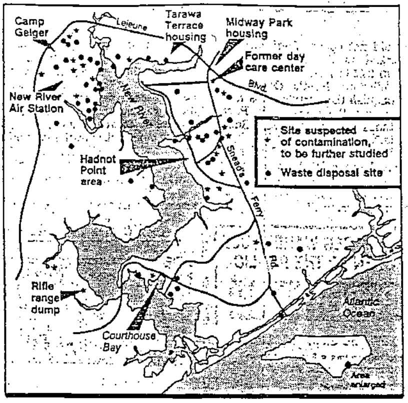
Camp Lejeune waste sites studied



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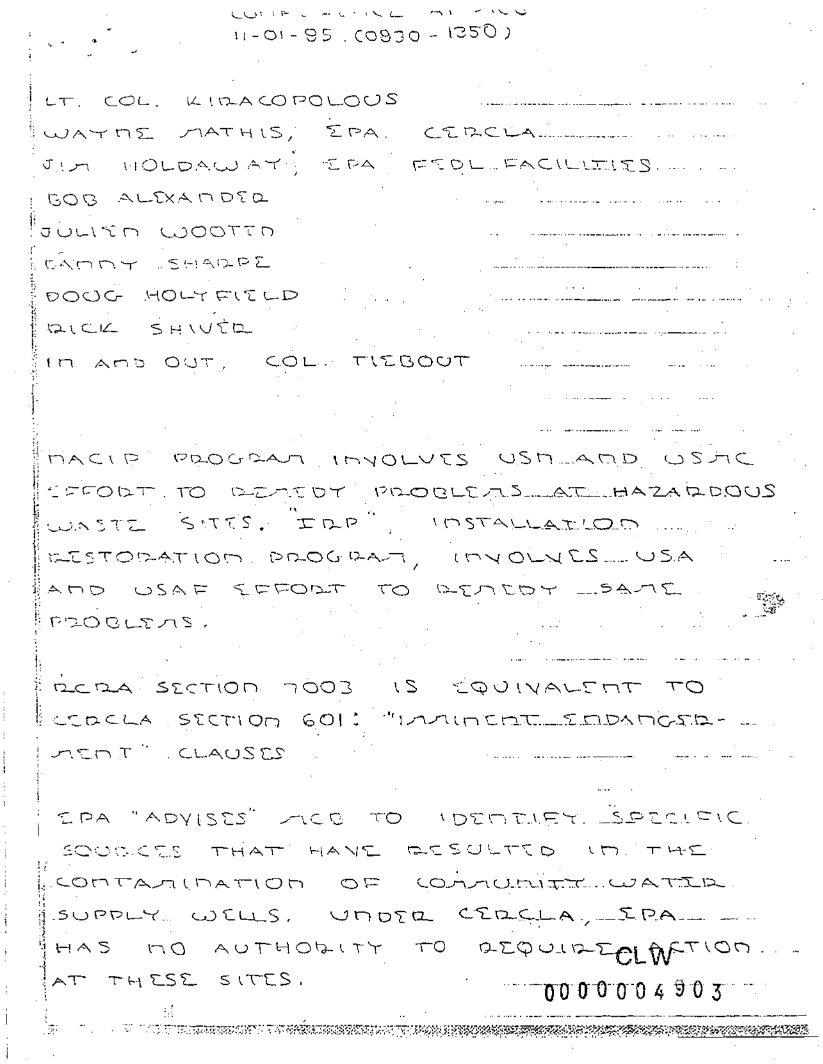
PAGE NO: 31A{cont.}
CITY/STATE: RALEIGH,N.C.
DATE: 15SEPT.85



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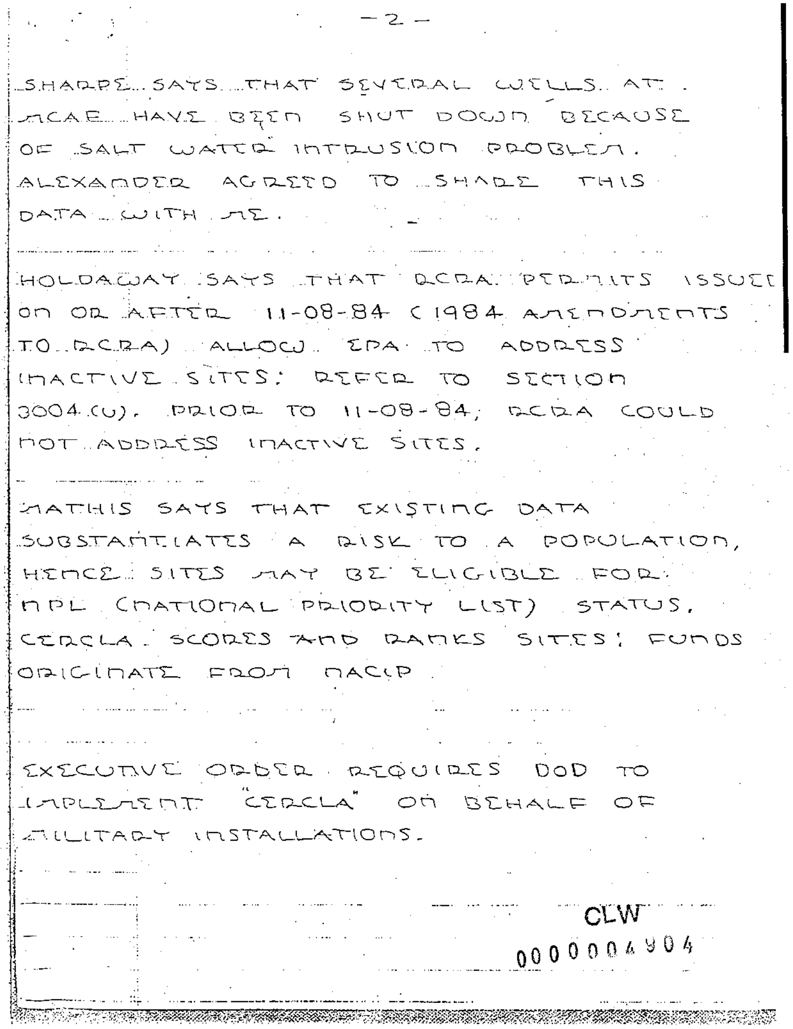
11-01-95 (0930 - 1350)

LT. COL. KIRACOPOLOUS
WAYNE MATHIS, EPA CERCLA
JIM HOLDAWAY, EPA FEDL FACILITIES
BOB ALEXANDER
JULIEN WOOTEN
DANNY SHARPE
DOUG HOLYFIELD
RICK SHIVER
IN AND OUT, COL. TIEBOUT

NACIP PROGRAM INVOLVES USN AND USMC EFFORT TO REMEDY PROBLEMS AT HAZARDOUS WASTE SITES. "IRP", INSTALLATION RESTORATION PROGRAM, INVOLVES USA AND USAF EFFORT TO REMEDY SAME PROBLEMS.

RCRA SECTION 7003 IS EQUIVALENT TO CERCLA SECTION 601: "IMMINENT ENDANGERMENT" CLAUSES

EPA "ADVISES" MCB TO IDENTIFY SPECIFIC SOURCES THAT HAVE RESULTED IN THE CONTAMINATION OF COMMUNITY WATER SUPPLY WELLS. UNDER CERCLA, EPA HAS NO AUTHORITY TO REQUIRE ACTION AT THESE SITES.



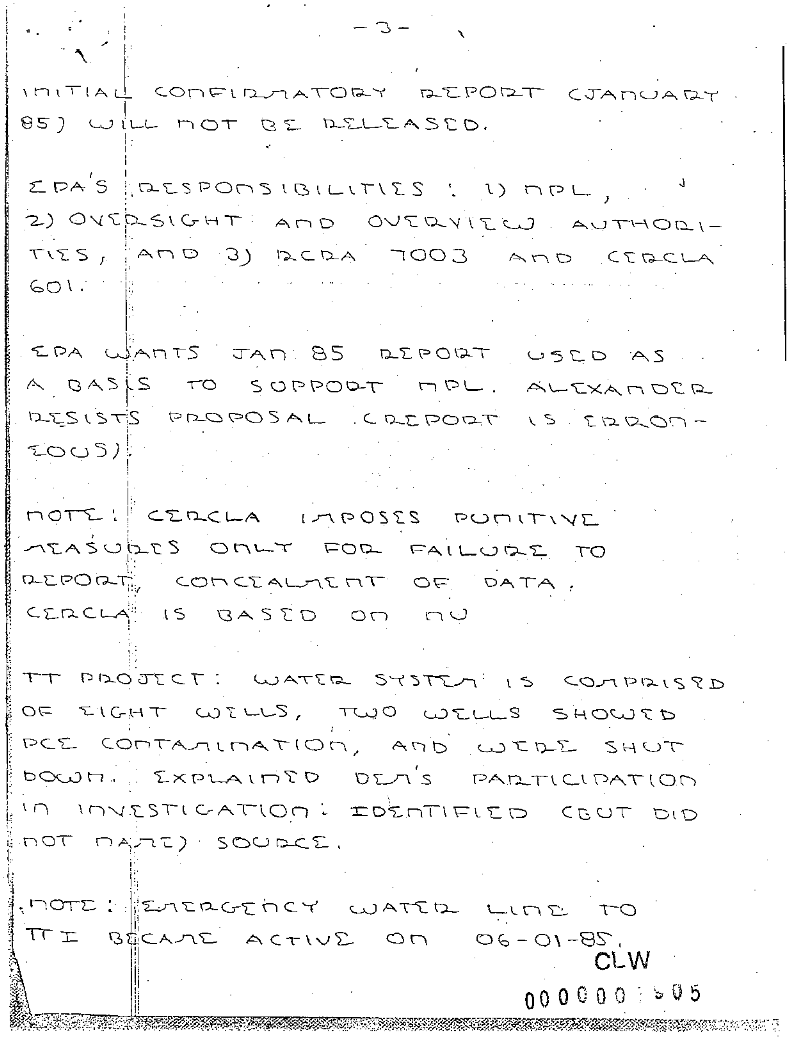
-2-

SHARPE SAYS THAT SEVERAL WELLS AT MCAE HAVE BEEN SHUT DOWN BECAUSE OF SALT WATER INTRUSION PROBLEM. ALEXANDER AGREED TO SHARE THIS DATA WITH ME.

HOLDAWAY SAYS THAT RCRA PERMITS ISSUED ON OR AFTER 11-08-84 (1984 AMENDMENTS TO RCRA) ALLOW EPA TO ADDRESS INACTIVE SITES; REFER TO SECTION 3004.(U). PRIOR TO 11-08-84, RCRA COULD NOT ADDRESS INACTIVE SITES.

MATHIS SAYS THAT EXISTING DATA SUBSTANTIATES A RISK TO A POPULATION, HENCE SITES MAY BE ELIGIBLE FOR NPL (NATIONAL PRIORITY LIST) STATUS. CERCLA SCORES AND RANKS SITES; FUNDS ORIGINATE FROM NACIP.

EXECUTIVE ORDER REQUIRES DOD TO IMPLEMENT "CERCLA" ON BEHALF OF MILITARY INSTALLATIONS.



-3-

INITIAL CONFIRMATORY REPORT (JANUARY 85) WILL NOT BE RELEASED.

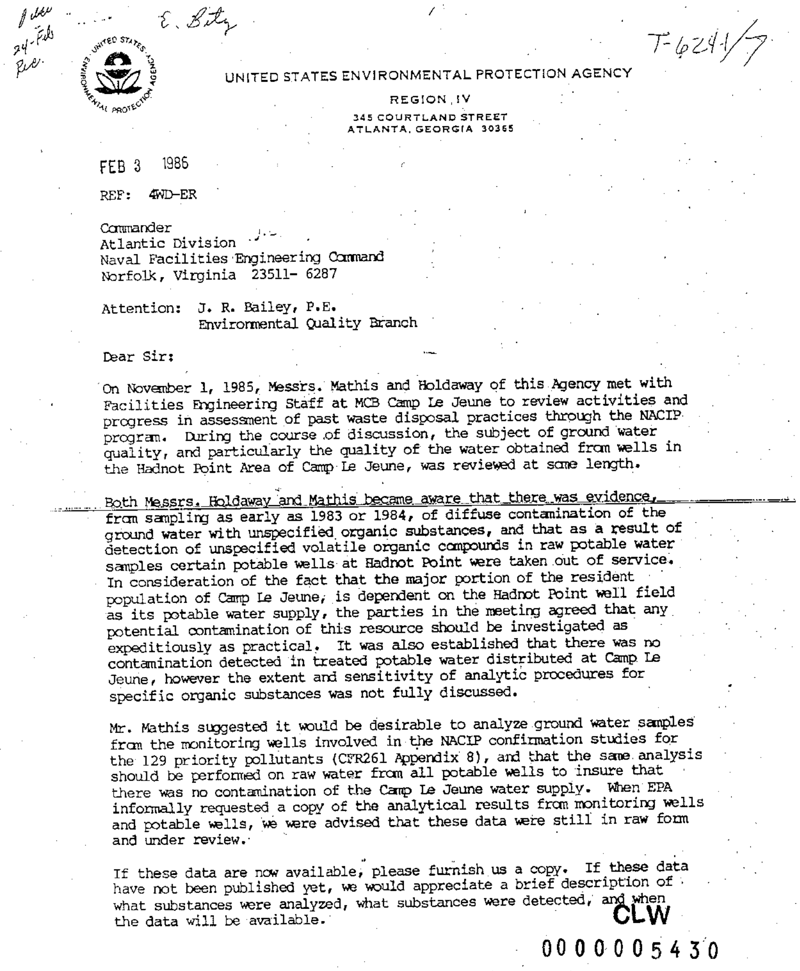
EPA'S RESPONSIBILITIES: 1) NPL, 2) OVERSIGHT AND OVERVIEW AUTHORITIES, AND 3) RCRA 7003 AND CERCLA 601.

EPA WANTS JAN 85 REPORT USED AS A BASIS TO SUPPORT NPL. ALEXANDER RESISTS PROPOSAL (REPORT IS ERRONEOUS).

NOTE: CERCLA IMPOSES PUNITIVE MEASURES ONLY FOR FAILURE TO REPORT, CONCEALMENT OF DATA. CERCLA IS BASED ON NU

TT PROJECT: WATER SYSTEM IS COMPRISED OF EIGHT WELLS, TWO WELLS SHOWED PCE CONTAMINATION, AND WERE SHUT DOWN. EXPLAINED DEM'S PARTICIPATION IN INVESTIGATION: IDENTIFIED (BUT DID NOT NAME) SOURCE.

NOTE: EMERGENCY WATER LINE TO TTI BECAME ACTIVE ON 06-01-85.



24-Feb
Rec.

E. Bitz

T-6241/7

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

FEB 3 1986

REF: 4WD-ER

Commander
Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 23511- 6287

Attention: J. R. Bailey, P.E.
Environmental Quality Branch

Dear Sir:

On November 1, 1985, Messrs. Mathis and Holdaway of this Agency met with Facilities Engineering Staff at MCB Camp Le Jeune to review activities and progress in assessment of past waste disposal practices through the NACIP program. During the course of discussion, the subject of ground water quality, and particularly the quality of the water obtained from wells in the Hadnot Point Area of Camp Le Jeune, was reviewed at some length.

Both Messrs. Holdaway and Mathis became aware that there was evidence, from sampling as early as 1983 or 1984, of diffuse contamination of the ground water with unspecified organic substances, and that as a result of detection of unspecified volatile organic compounds in raw potable water samples certain potable wells at Hadnot Point were taken out of service. In consideration of the fact that the major portion of the resident population of Camp Le Jeune, is dependent on the Hadnot Point well field as its potable water supply, the parties in the meeting agreed that any potential contamination of this resource should be investigated as expeditiously as practical. It was also established that there was no contamination detected in treated potable water distributed at Camp Le Jeune, however the extent and sensitivity of analytic procedures for specific organic substances was not fully discussed.

Mr. Mathis suggested it would be desirable to analyze ground water samples from the monitoring wells involved in the NACIP confirmation studies for the 129 priority pollutants (CFR261 Appendix 8), and that the same analysis should be performed on raw water from all potable wells to insure that there was no contamination of the Camp Le Jeune water supply. When EPA informally requested a copy of the analytical results from monitoring wells and potable wells, we were advised that these data were still in raw form and under review.

If these data are now available, please furnish us a copy. If these data have not been published yet, we would appreciate a brief description of what substances were analyzed, what substances were detected, and when the data will be available.

This Agency is concerned that a potential for human exposure to hazardous substances and hazardous wastes via the Camp Le Jeune water supply may exist due to the presence of such materials in ground water in the general vicinity of the potable well field. The existance of such a potential exposure would warrent consideration of this area for inclusion on the National Priority List, with an attendant increase in the expediency of investigation and remediation.

We appreciate your assistance in obtaining these data in order that this potentially significant problem may be addressed.

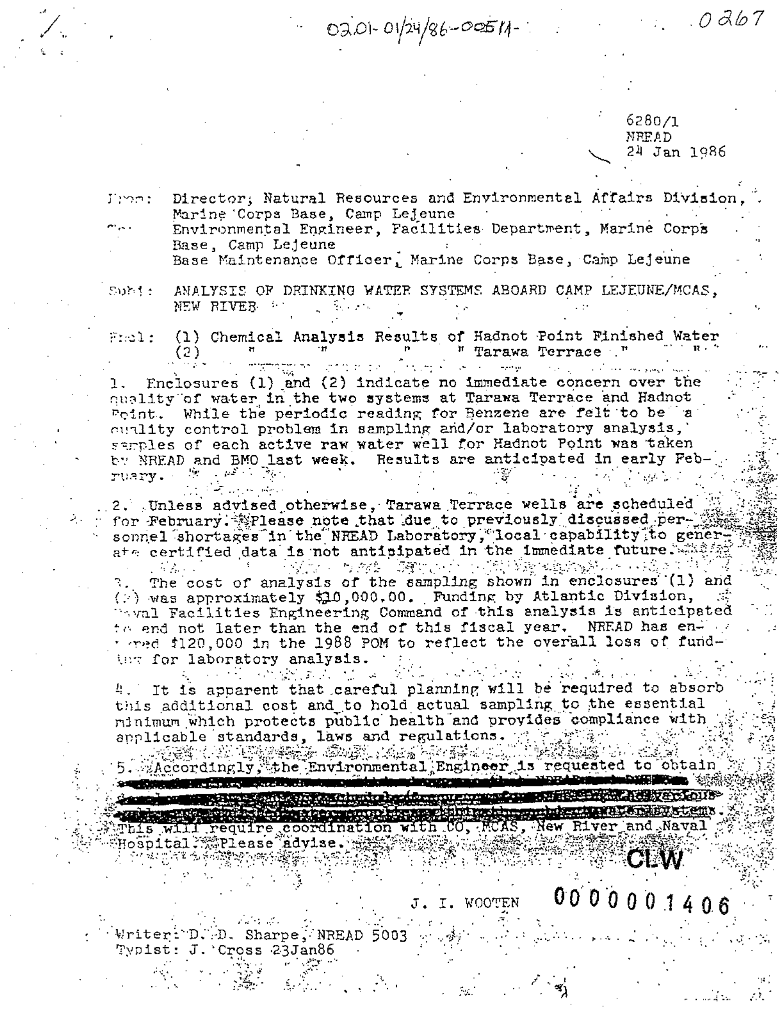
If you have any questions, please do not hesitate to contact me at (404) 347-3776 or FTS 257-3776.

Sincerely,

Arthur G. Linton

Arthur G. Linton, P.E.
Regional Federal Facilities Coordinator
Environmental Assessment Branch
Office of Policy and Management

cc: Commander, MCS Camp Le Jeune
Lee Herwig
Paul Hubbell, Navy Department, Washington, DC



02.01-01/24/86-00514- 0267

6280/1
NREAD
24 Jan 1986

From: Director, Natural Resources and Environmental Affairs Division, Marine Corps Base, Camp Lejeune
To: Environmental Engineer, Facilities Department, Marine Corps Base, Camp Lejeune
Base Maintenance Officer, Marine Corps Base, Camp Lejeune

Subj: ANALYSIS OF DRINKING WATER SYSTEMS ABOARD CAMP LEJEUNE/MCAS, NEW RIVER

Encl: (1) Chemical Analysis Results of Hadnot Point Finished Water
(2) " " " " Tarawa Terrace " "

1. Enclosures (1) and (2) indicate no immediate concern over the quality of water in the two systems at Tarawa Terrace and Hadnot Point. While the periodic reading for Benzene are felt to be a quality control problem in sampling and/or laboratory analysis, samples of each active raw water well for Hadnot Point was taken by NREAD and BMO last week. Results are anticipated in early February.

2. Unless advised otherwise, Tarawa Terrace wells are scheduled for February. Please note that due to previously discussed personnel shortages in the NREAD Laboratory, local capability to generate certified data is not antisipated in the immediate future.

3. The cost of analysis of the sampling shown in enclosures (1) and (2) was approximately $10,000.00. Funding by Atlantic Division, Naval Facilities Engineering Command of this analysis is anticipated to end not later than the end of this fiscal year. NREAD has entered $120,000 in the 1988 POM to reflect the overall loss of funding for laboratory analysis.

4. It is apparent that careful planning will be required to absorb this additional cost and to hold actual sampling to the essential minimum which protects public health and provides compliance with applicable standards, laws and regulations.

5. Accordingly, the Environmental Engineer is requested to obtain [redacted]. This will require coordination with CO, MCAS, New River and Naval Hospital. Please advise.

CLW

J. I. WOOTEN

0000001406

Writer: D. D. Sharpe, NREAD 5003
Typist: J. Cross 23Jan86

02.01-01/24/86 00511-

SYSTEM : HADNOT POINT

DATE	TTHMs	1,1,1-TRICHLORO ETHANE	BENZENE	METHYLENE CHLORIDE	TOLUENE	DATE	TTHMs	BENZENE	TOLUENE
4/24/85	*	2.1				12/2/85	*		
6/18/85	*					12/10/85	*	38	10
6/24/85	*					12/18/85	*	1.0	
7/1/86	*					12/23/85	*		
7/8/85	*					12/30/85	*		
7/15/85	*								
7/23/85	*								
7/31/85	*								
8/13/85	*								
8/19/85	*								
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9/3/85	*								
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9/16/85	*								
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10/15/85	*								
10/21/85	*								
10/29/85	*								
11/4/85	*								
11/12/85	*								
11/19/85	*		NOT REPRESENTATIVE 2500	2600	100				
11/26/85	*								

ENCLOSURE (1)

02:01-01/24/86 – 00511

SYSTEM: TARAWA TERRACE

DATE	THMs	1,1,1-TRICHLORO-ETHANE	TETRACHLORO-ETHYLENE	BENZENE	DATE	THMs	BENZENE
4/22/85	*	4.1	1.0		12/2/85	*	2.0
4/23/85	*	1.4			12/10/85	*	
7/1/85	*				12/18/85	*	1.0
7/8/85	*				12/23/85	*	
7/15/85	*				12/30/85	*	
7/23/85	*						
7/31/85	*						
8/13/85	*						
8/19/85	*						
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9/3/85	*						
9/10/85	*			4.0			
9/16/85	*						
9/23/85	*						
10/1/85	*						
10/9/85	*						
10/15/85	*						
10/21/86	*						
10/29/85	*						
11/4/85	*						
11/12/85	*						
11/12/85 TT-25 WELL							
/19/85	*						
11/26/85	*						

* THMs FOUND WITHIN LIMITS

ENCLOSURE